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INTRACRANIAL CAUSES OF HEADACHE *

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Causes of Head Pains

The causes of pains in the head are customarily, and for diagnostic purposes conveniently, grouped on an essentially anatomical basis:

1. *Intracranial*—namely, diseases of the brain and meninges.

2. *Cranial*—namely, diseases of the skull bones and the enclosed air sinuses.

3. *Extracranial*—namely, diseases of the scalp. For example, fibromyositis of the occipito-frontalis muscle or its aponeurosis: trigeminal, spheno-palatine (Sluder's), and occipital neuralgias; herpes supra-orbitalis; temporal arteritis, etc.

4. *Reflex*, from diseases of the eyes, teeth, and nose, though nasal causes might produce their effect through the air sinuses—for example, by inflammatory changes spreading to them or the production of so-called "vacuum" headache.

5. *Toxic:* the source being (*a*) exogenous—for example, alcohol, tobacco, lead, poisonous fumes, CO_2, etc.; or (*b*) endogenous—for example, uraemia, constipation, fevers.

6. *Migraine:* an incomplete diagnosis signifying a syndrome—that is, a constantly recurring group of symptoms—which is the clinical expression of a disturbed mechanism common to many pathological states. It merits a separate category because the syndrome itself is significant even when the exciting cause remains unmasked (cf. epilepsy).

7. *Psychogenic*—occurring in psychoneuroses, psychoses, and exhaustion states.

This paper is concerned chiefly with the first and sixth groups. Let me stress at the outset that headache is a symptom unaccompanied by specific physical signs capable of quantitative assessment. Hence in any given case in which headache is the presenting symptom we are dependent on the patient's descriptive powers for a knowledge of: (1) its *site and duration*, which are often vague, especially in retrospect; (2) its *character*, including its quality; its mode of onset and decline; whether it is constant, intermittent, or subject to paroxysmal exacerbations; the circumstances which aggravate or alleviate it—an accurate description of which often defeats the verbal resources of even the more intelligent of patients; and (3) its *intensity*, which varies not only with the severity and rate of development of the cause but also with the patient's threshold for pain—the same noxious stimulus in one patient producing "slight headache," in another "excruciating pain." Hence the patient's account of headache may be of little diagnostic value, and it is not surprising that a recent annotation in the *British Medical Journal* (May 6, 1939, p. 929) should speak of headache as "a symptom which has for long been one of the commonest, most unintelligible, and most intractable with which the practitioner has to deal." While it is true that few human beings can claim never to have suffered from headache, recent advances in therapeutics, both medical and surgical, have rendered many types more amenable to treatment, and recent observations, both experimental and clinical, have thrown considerable light on the mechanism of production of headache. This knowledge is of fundamental importance for a proper understanding of the problem under discussion. It is to-day beyond reasonable doubt, for example, that the mechanism of cardiac pain is the same—myocardial anoxia—whether the pathological cause be coronary thrombosis, angina of effort, myocardial fibrosis, or profound anaemia. If it could be demonstrated that the mechanisms of headache were similar, whether brought into play by a systemic disturbance such as fever, or local intracranial lesions such as injury, inflammation, tumours, etc., we should then be led to the significant conclusion that there is no type of headache which is of itself pathognomonic of an intracranial lesion, and we should have to look to other characters of the headache—its site, intensity, mode of evolution, the circumstances which affect it, and associated symptoms and signs—to suggest not only its intracranial origin but the nature of the causative lesion. To examine this problem as it affects all head pains exceeds the scope of our immediate inquiry. I propose, therefore, to confine myself to a consideration of certain pertinent questions.

1. How often does Headache indicate Organic Nervous Disease?

Physicians with differing special interests will give widely varying answers to this question. Spriggs found organic nervous disease in twenty-six out of 500 patients with chronic headache. Of my last 500 patients in whom headache was a dominant symptom, ninety-six were suffering from organic nervous disease. Doubtless the neurologist would find an even larger proportion among his patients. It is thus only a relatively small number of sufferers from chronic headache who are the victims of organic intracranial disease.

* Read in opening a discussion in the Section of Neurology and Psychiatry at the Annual Meeting of the British Medical Association, Aberdeen, 1939.

2. Of what Intracranial Lesions is Headache a Common Presenting Symptom ?

At some time in their evolution all intracranial lesions may be associated with headache. In some, however, headache is a dominant and often the presenting symptom ; in others it is merely incidental and overshadowed by other symptoms and signs. For reasons which will become clearer as our argument develops it is useful to classify the former group as follows:

Group I.—Those which trespass on the space occupied by normal intracranial structures ("expanding lesions"): (*a*) "*tumours*"—namely, neoplasms, cysts, abscesses, aneurysms, granulomata, subdural haematoma, hyperostosis interna frontalis, etc. ; (*b*) *swelling of the brain itself* due to oedematous and inflammatory changes (for example, encephalitis, disseminated sclerosis, etc.), vascular lesions such as haemorrhage and thrombosis, injuries with resulting haemorrhages and oedema.

Group II.—*Meningeal irritation,* by inflammatory exudate (that is, meningitis of all types, whether acute or chronic), haemorrhage into the subarachnoid space, and cancer cells (as in meningitis carcinomatosa).

Group III.—*Disease of the cerebral arteries*—cerebral arteriosclerosis, syphilitic endarteritis, hypertension, etc.

Group IV.—A miscellaneous group with no demonstrable gross pathology—for example, post-traumatic headaches, migraine, and epilepsy.

Much overlapping will be detected in this grouping. A cerebral tumour is not infrequently associated with haemorrhage and oedema ; trauma with a subdural haematoma or intracerebral haemorrhage, and so forth.

In relation to this classification three points are worth stressing. First, that the more rapid the development of the causative pathological lesion the more intense is likely to be the accompanying headache. Secondly, that the earlier and more marked the interference with the circulation of the cerebrospinal fluid, the earlier in onset and more intense is the associated headache. For example, while headache is the presenting symptom in 90 per cent. of patients suffering from tumours of the posterior fossa, in only 33 per cent. of supratentorial tumours is it the initial complaint. The former early obstruct the outflow of cerebrospinal fluid from the fourth ventricle and cause internal hydrocephalus. Moreover, patients with temporal lobe tumours, which more easily disturb the third ventricle, complain of headache as their initial symptom much more frequently than patients with frontal lobe tumours, where the circulation of the cerebrospinal fluid is unlikely to be disturbed in the early stages. And thirdly, whilst in adults the skull is a closed and, for all practical purposes, an inexpansile box, in children expansion of the cranium is possible before closure of the sutures, hence space-occupying lesions may not so grossly disturb intracranial pressure relations.

Before considering the significance of our classification, let us turn to the third question.

3. What Varieties of Headache may be Found Associated with Intracranial Pathology ?

There are four varieties of headache commonly complained of by patients suffering from intracranial disease.

Type 1.—A pain vaguely described as dull or throbbing, but sometimes as a "sharp stab," "bursting," or "splitting" pain. It is usually felt "inside the head," and the localization is indefinite, though during an attack, which is the best time to determine its site, it may be described as unilateral, frontal, occipital, or temporal. It is usually worse on waking, and careful questioning will often reveal that the exciting factor at this time is the sudden turning over in bed or sitting up. Its most characteristic feature is its aggravation by coughing, sneezing, stooping, or straining at stool, and often each pulsation of the heart, or on walking each step, gives a "thump in the head." Usually jugular vein compression aggravates though carotid artery compression eases the pain. It may be constant or intermittent, but paroxysmal exacerbations occur, and with these projectile vomiting is not uncommon. *This type of headache is complained of most commonly in "expanding lesions" of the brain.* Even when remote areas of the brain are affected the pain is usually referred to the forehead. If unilateral it is on the same side as the lesion in about 75 per cent. of cases ; in 10 per cent., however, it is referred to the side opposite to the lesion. Occasionally we encounter attacks of sudden excruciating generalized pain "as if the head were going to burst." These come like a bolt from the blue and attain their maximum intensity within a few seconds, during which time the patient is quite uncontrollable and not infrequently semi-conscious. The attacks last a varying period, from a few seconds to a few minutes, and disappear quite rapidly. They are sometimes accompanied by vomiting and are usually followed by profound exhaustion. From such descriptions as I have been able to elicit this type of attack is simply an acute and intensely severe, if transitory, exacerbation of the type above described. Though rare, it is almost invariably associated with tumours, especially of the posterior fossa, and is a symptom of grave import because it indicates foraminal or tentorial crowding.

Type 2.—A sharp pain at the back of the head and radiating down the back of the neck, but which is referred also to the temporal and frontal regions and is accompanied by rigidity of the retronuchal muscles. It is aggravated by movements of the head and attempted flexion of the neck. This type of pain is seen in its most acute and severe form in basal subarachnoid haemorrhages which extend into the posterior fossa and irritate the medulla and upper cervical cord. It is also an almost constant accompaniment of all forms of meningitis. It occurs in about 50 per cent. of posterior fossa tumours and in about 25 per cent. of supratentorial tumours. Occipital neuralgia and neuritis are associated with a similar type of pain. In occipital neuralgia, however, there is a long-standing history of paroxysms of shooting pains with completely free intervals ; neither neck rigidity nor fronto-temporal radiation of the pain accompanies a simple neuralgia. Where, however, an occipital neuritis results from vertebral disease or cervico-occipital fibromyositis, though the accompanying pain has neither frontal nor temporal radiation, limitation of neck movements might be present. This rigidity, however, differs from that of meningeal irritation both in its type and in its extent. The rigidity of meningeal irritation is confined to the extensor muscles of the neck, giving rise to neck retraction and to Kernig's and Brudzinski's signs ; vertebral rigidity limits neck movements in all directions ; fibromyositis causes pain on attempted stretching of the affected muscles. Moreover, the local tenderness and other evidences of spondylitis and fibromyositis serve easily to distinguish meningeal from extracranial causes of neck rigidity.

Type 3.—The *migrainous* type of headache—namely, a recurring paroxysmal headache often, though not necessarily, unilateral, accompanied by nausea, vomiting, dizziness, and frequently preceded by disturbances of vision or other sensory and motor aurae. Between the attacks the patient is free from headache, but during the attack the *pain corresponds to that of Type 1.*

A fourth type, which not infrequently accompanies pituitary tumours, is that of a dull ache, usually frontal and temporal, rarely spreading to the occiput, and associated with *neuralgic pains radiating to the eyes, eyebrows, or face*. This neuralgic element is thought to be due to direct involvement of the upper roots of the fifth nerve. Its first component does not differ from the pain described as Type 1; hence it does not merit differentiation into a separate type, and we can therefore limit our clinical description of the headache found in intracranial lesions to three types.

Correlation of Types and Lesions

When we tabulate these types and the intracranial lesions with which they are associated, a significant correlation becomes evident. Type 1 is commonest in Group I lesions—the "space-trespassing" group; Type 2 in Group II lesions—the "meningeal irritation" group. Type 3 is commonest in vascular lesions, especially intracranial aneurysms, cerebral arteriosclerosis, hypertension, and the migraine of allergic, endocrinous, biliary, etc., origin. All three types of headache (and this is to be specially noted in regard to migraine) are consistent with, though not necessarily indicative of, gross intracranial pathology. All types have been found on occasion associated with cerebral tumours, abscesses, encephalitis, thrombosis, head injuries, etc. Yet all have occurred in the absence of demonstrable cerebral pathology, thus suggesting that the essential mechanisms are functional and not dependent on an irreversible structural change.

The mechanism of Type 2 headache is clearly related to irritation of the meninges: a knowledge of the nerve supply to the meninges and meningeal vessels suggests that pain is referred to the skin areas supplied by the same sensory nerves (frontal, facial, and temporal pain arising from the fifth nerve which is distributed to the anterior and middle fossae; occipital and retronuchal pain from the upper cervical roots which supply the posterior fossa) and that the accompanying retronuchal rigidity owes its origin to an accompanying sensori-motor reflex. Direct irritation from pressure of the brain (for example, in internal hydrocephalus), or of a tumour itself, might cause similar "meningeal" pain. This type of pain can, as Northfield suggests, be regarded as analogous to somatic pains elsewhere in the body in that their characters (sharp, stabbing, and continuous) are similar and accurate localization is in both cases possible (cf. the pain of peritonitis, pleurisy, and pericarditis). When we analyse migraine (Type 3) we find that the headache component corresponds in all respects to Type 1. What serve to differentiate migraine as a syndrome are the aurae, the paroxysms, the common hemicrania, the short duration, and the free intervals.

It is tempting to regard the headache of Type 1 as being the expression of increased intracranial pressure and the resulting irritation of the dura mater. Indeed, until very recently this view was generally held. It was known that the cerebrospinal fluid pressure in this type of headache is usually high and that factors increasing intracranial pressure cause exacerbations of the headache. But similar headaches are found with low or normal cerebrospinal fluid pressures. In 15 to 20 per cent. of intracranial tumours the ventricular pressure is not raised. After lumbar puncture a headache clinically similar in all respects to Type 1 not infrequently develops. The experimentally induced headache following histamine injections occurs after the cerebrospinal fluid pressure, transitorily raised following the injection, has returned to normal. Hence it seems likely that both high and low cerebrospinal fluid pressures may bring into play the mechanism responsible for Type 1 headache.

The most recent work points to the sources of pain being closely related to the intracranial arteries and the dura mater around the large venous sinuses, and that "an abnormal state of tension in the walls of the cerebral blood vessels causes headache." It is, however, useful to pursue Northfield's suggestion further and regard Type 1 headache as corresponding to a visceral pain. On the analogy of cardiac pain I would postulate that the main factor producing Type 1 headache is cerebral anoxia, and that any condition which interferes with adequate oxygen utilization by the brain may result in this type of headache. I have not the space to pursue this conception in greater detail, and I am aware that oxygen deficiency itself may disturb vascular tone, but I would stress the striking benefit which results from oxygen administration in all forms of Type 1 headache (especially migraine and hypertension) and often in meningeal headaches—for example, after encephalography.

On this view all headaches of Type 1, whether the cause be general or intracranial, are an expression of a similar mechanism. Hence the description of the quality of this headache *per se* is not of great diagnostic significance. The features which suggest that a Type 1 headache might be associated with intracranial disease are: (1) its *site* (especially predominantly hemicranial); (2) its *course* (especially if progressively intense); and (3) accompanying signs of (*a*) *increased cerebrospinal fluid pressure* (papilloedema and manometry), (*b*) *focal nerve signs*—irritative and paralytic, or (*c*) *Type 2 headache*.

To summarize: (1) Type 2 headache invariably points to an intracranial lesion associated with meningeal irritation by blood, inflammatory exudate, neoplastic cells, parasites, cyst fluid (for example, hydatid), or direct pressure. (2) Type 1 headache might be due to any general or intracranial lesion which leads to cerebral anoxia. An intracranial origin is suggested not by the description of the headache but by the associated symptoms and signs.

A few words must be added on migraine, epilepsy, and post-traumatic headaches. The focal aurae of migraine which precede the hemicrania by a variable though short period may be accompanied by phenomena of angiospasm and relieved by alleged vasodilators (for example, ergotamine tartrate); but for the headache which follows, if the attack is not aborted in an early stage, these drugs are of no value, though the inhalation of oxygen (100 per cent.) will in most cases give complete relief. Similar beneficial effects have been observed after giving oxygen in post-epileptic headaches. The headache following trauma often has a Type 2 component, though Type 1 is dominant. The relief from post-traumatic headache which occasionally follows air injection into the subarachnoid spaces may be the direct result not only of the breaking down of meningeal adhesions but also of preventing traction on the smaller cerebral arteries by these adhesions, with resulting alterations in vascular tone.

A Scheme for Investigation of Patients

On the basis of the above observations it is possible to formulate a scheme for the investigation of the patient in whom headache is a dominant and early symptom. It must aim at providing answers to three questions: (1) Is an intracranial lesion present? If so, (2) what is its site? and (3) what is its nature?

In the first instance a careful *anamnesis* is essential, for in most cases it will provide the major evidence on which

the presence of an intracranial lesion is suspected. We must inquire closely into how long headaches have been present and how often they recur. What is their site, duration, intensity, and character? Are they improving or becoming worse? Is there an aura? Does a late meal, fatigue, worry, or excitement precipitate an attack? Are they related to the menses? Is there a family history of similar headaches, of hay-fever, asthma, eczema, or urticaria? Does heat relieve and cold aggravate? Is the scalp tender to touch? (If so, a "rheumatic" cause is likely.) Does reading bring on the headache? Have glasses relieved them? Is the nose stuffy before the attack? Has there been a recent cold? Is there a nasal discharge? These and a host of other questions may be put, and a correct interpretation and assessment of the answers will almost invariably guide the physician to the seat of the trouble.

Next a careful *clinical examination* should be carried out. It must in all cases include an examination of the fundi for papilloedema, retinitis, arteriosclerosis, choroiditis, etc., and a detailed examination of the central nervous system for evidence of focal disease, increased intracranial pressure, meningeal irritation, etc. Palpation and auscultation of the skull must never be omitted. If necessary, the assistance of an ophthalmologist to exclude local ocular causes—for example, errors of refraction, impaired ocular muscle balance, glaucoma, etc.—and of a throat specialist to exclude causes in the nasopharynx, sinuses, and ears must be sought, though the unmasking of unsuspected pathology in these sites does not necessarily reveal the cause of the headache. In my experience careful questioning will usually decide whether a headache has an ocular or a sinus origin: the characteristics of these headaches do not resemble those we have described as occurring in intracranial lesions. The occurrence of meningitis and cerebral abscess as a complication of sinus disease and otitis must be remembered. Physical examination will include also a search for cardiovascular sclerosis, hypertension, toxaemias, etc.

Accessory Methods of Investigation

If the suspicion of an intracranial lesion is raised, accessory methods of investigation might have to be undertaken. Of these, two are of prime importance: first, an examination of the *cerebrospinal fluid*; secondly, *radiological investigation*. If a tumour is suspected, lumbar puncture must not be lightly undertaken, because of the danger of foraminal or tentorial crowding. In all cases the cerebrospinal fluid pressure should be measured; and a full chemical and bacteriological examination will usually show characteristic changes where meningeal irritation or infection is present. Syphilis, subarachnoid haemorrhage, uraemia, lead encephalopathies, etc., often produce pathognomonic changes in the fluid. *X*-ray examination of the skull and sinuses has become a routine in the investigation of chronic headache. Contrast radiography (after the injection of air into the subarachnoid space or ventricles, or, when aneurysms are suspected, after the injection of thorotrast into the cerebral arteries through the common carotid) is a measure of growing importance, but should be undertaken only by the expert.

In coming to a decision about the *nature of the intracranial lesion* responsible for headache the physician will consider the age of the patient; the site of the lesion; the duration and mode of evolution of the symptoms; evidence of disease elsewhere—for example, syphilis, scar of radical mastectomy, neurofibromatosis, etc.—all of which lesions might have accompanying intracranial pathology; and accessory tests—serological, cutaneous, blood and cerebrospinal fluid examinations, auscultation of the skull, and radiography. A detailed consideration of the significance of these is beyond the scope of my contribution.

Conclusion

I have attempted to formulate the principles which should govern the diagnosis of the intracranial causes of headache, with special emphasis on that aspect of the problem which confronts the general physician. The commoner pitfalls should be avoided by remembering

1. That headaches which are progressively severe or recur in paroxysms of increasing frequency and severity, and are accompanied by dizziness, vomiting, mental deterioration, epileptiform attacks, or focal nerve signs, must be regarded as due to organic brain disease until the contrary is proved.

2. That the onset of migraine after the age of 40 should arouse the suspicion of gross intracranial disease. The most commonly associated lesions are cerebral tumour, syphilis, and hypertensive cerebral arteriosclerosis.

3. That migraine constantly localized to the same side and followed by ocular paresis is almost diagnostic of a basal intracranial aneurysm.

4. That recurring attacks of so-called cyclical vomiting in children, if accompanied by a severe headache, usually indicate a posterior fossa tumour.

5. That the diagnosis of a "psychogenic headache" is often the refuge of the diagnostically destitute. It should be the last and not the first suspicion, and the diagnosis must be based on positive evidence, not solely on "the absence of any evidence of organic disease."

6. That an intracranial lesion, even a tumour, may run its course without at any time giving rise to a complaint of headache.

Summary

The customary classification of the causes of head pains is given.

The following questions are considered: (1) How often does headache indicate organic nervous disease? (2) Of what intracranial lesions is headache a common presenting symptom? (3) What varieties of headache may be found associated with intracranial lesions?

From an analysis of the clinical histories two types which finally emerge are reviewed.

Migraine, epileptic, and post-traumatic headaches are discussed.

A scheme is formulated for investigation of the patient in whom headache is a dominant and early symptom.

Small-pox Vaccination.—The intradermal injection of vaccinia virus which has been cultivated in a medium containing chick embryo tissue produces no untoward reaction and a considerable though possibly not fully adequate degree of immunity. It is suggested that this proceeding should be applied six to twelve months before ordinary dermal vaccination with calf-lymph virus in order to minimize the undesirable effects which the latter may cause. The authors resent the attitude which regards an extensive vaccination scar as a "badge of health"; such a scar is not only unnecessary but gives a sense of security which with the lapse of time ceases to be justified.—Amount and Duration of Immunity induced by Intradermal Inoculation of Cultured Vaccine Virus. T. M. Rivers, S. M. Ward, and R. D. Baird.—*J. exp. Med.*, June, 1939, **69**, 857.

HEADACHE AS AN EARLY SYMPTOM OF NERVOUS AND MENTAL DISORDER*

BY

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The frequency of headache as a complaint needs no emphasis, and there is an increasing recognition that it should very often be regarded as evidence of a psychiatric problem. Thus Spriggs (1935), in an analysis of 500 cases, came to the conclusion that in 203 the headache was of "functional" origin. This finding is all the more striking in that Ruthin Castle is primarily concerned with cases of organic disease. There can therefore be little doubt that the headache in a large number of these cases was thought before admission to be directly dependent upon some physical or exogenous cause, which the most thorough physical investigation failed to reveal. Indeed, it is probable that the recognition of headache as evidence of a psychiatric problem is apt only to be reached by a process of exclusion, for which purpose the maxim that it is necessary to eliminate all possible physical causes before deciding that a case is "functional" is taken as the guiding principle. There can be little doubt that a mistakenly conscientious and sometimes ruthless application of this principle can have the most unfortunate consequences; and we have all seen patients who have been subjected to elaborate investigations, treatments, and even operations which, quite apart from the consumption of time and money involved, have been as unnecessary as they have been negative, or even actively harmful, in their results.

The objection may well be raised that it is very easy to be wise after the event, and that the above criticism would be more helpful if psychiatry had really a positive contribution to make to the diagnosis of a "functional" headache, to supplement the purely negative position that this is a question of excluding all possible physical causes. I propose, therefore, to discuss what seem to be some of the *positive* points in the diagnosis of these headaches as revealed by the study of (1) the nature of the complaint, (2) the past history of the individual concerned, and (3) the other or associated symptoms that may also be found. Before attempting these tasks it may be well to touch, very briefly, upon certain general considerations, starting with some possible misconceptions.

Psychiatric and Psychogenic

It should be clear that when the claim is made that the headache of a particular patient should be regarded as evidence of a psychiatric problem, this does not necessarily imply that the origin of the headache is purely psychogenic. Headache is a symptom that may be encountered in every type of mental disorder, and not even psychiatrists, who believe some queer things, hold the view that all mental disorder is purely psychogenic in origin. There is, in fact, general agreement that mental ill-health (with or without headache as an accompanying symptom) results from the interaction of numerous factors, which can roughly be grouped as mental, physical, and constitutional; and these three factors are always and inevitably present and operative, though they vary greatly in their practical importance from case to case.

Bearing the above considerations in mind, it is easy to understand how misleading the classical antithesis between "functional" and "organic" may become; for by "functional" is often understood "psychogenic," and by "organic" is often understood "physical" or "exogenous." Thus it is very easy for the organically minded to make the mistake of attributing a headache to some physical finding which may be coincidental, concomitant, or consecutive rather than causal, or which may only be a contributory factor in the production of that general state of mental ill-health of which the headache is a symptom; whereas for the psychologically minded it is very easy to make the mistake of attributing an organic headache to a psychogenic situation which may also be merely coincidental, and, given sufficient determination, a psychogenic situation of a sort is forthcoming in us all.

The question as to whether a headache should or should not be regarded as evidence of a psychiatric problem does not, I think, depend upon the presence or absence of physical findings, but rather upon whether the headache can be directly attributed to the operation of impersonal physical factors, or whether it is attributable to and evidence of personality problems or disorder of the personality as a whole, in the production of which physical and constitutional as well as psychological factors may well have played a more or less important contributory part.

Special Significance of our Head

It is true that we have a general and objective perception of our head as part of our body, but our head also has for us a significance such as no other part possesses. Our head is not only experienced as a physical whole but is recognized as the seat of many of our most important sense organs, upon whose functional integrity depends our mental as well as our physical orientation to the environment. Although the eyes probably hold the first place for most of us in this connexion, the general principle is particularly well illustrated in the stimulating article by Schilder (1933) upon the role of the vestibular apparatus in psychiatry and psychiatric symptomatology.

Our heads, and what they contain, are thus of very special importance to us. Moreover, the central nervous system has no sensory organ of its own, and consequently we have no direct perception of its action. It is therefore easy to understand how it comes about that our head is not only something which is physically experienced but is also something which is psychologically experienced as the place where our ego is localized. Our head accordingly comes to mean for us the most important part of being, our personality; and this psychological meaning and significance finds frequent expression in such common metaphors as "losing" or "keeping" our head.

The special significance attached to the head can also be seen in the alarm caused by a fracture of the skull or a tumour in the brain compared with the lesser reaction produced by similar events in other parts of the body. For anything that may affect the brain or head is experienced subjectively as a very special threat to the ego or personality; and, conversely, a threat to the personality or upset of the sense of well-being, however caused, is often experienced subjectively as a head discomfort or headache. This is surely the reason why it should be that head discomfort or headache is such a frequent symptom of mental ill-health; and this head experience or headache has typically a global quality of a highly

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unpleasant character that pervades the whole being and personality rather than the quality of an objective perception of definite sensory pain.

1. Nature of the Complaint

These considerations may help to explain why it can almost be said that the characteristic thing about the psychiatric headache is that it is not characteristic, except perhaps of the personality of the sufferer. Thus Wilson (1938), in his interesting study of patients with headache referred for psychotherapy, divided them into three groups —those with a sense of pressure or heaviness, those with a dull ache, and those with a sense of throbbing—and came to the conclusion that the former two varieties tended to occur most frequently in patients with a more passive type of personality, while the latter variety occurred in more active or aggressive types. Wilson also makes the important point that half his patients described their headaches in terms which were not exaggerated, and did not use such colourful phrases as "like a screw driven into my skull," or "every hair of my head like a wire being drawn." This is not really surprising, for not every sufferer from mental ill-health needs to find self-expression in melodramatic language.

THE QUALITY OF THE HEADACHE

I submit, therefore, that the typical characteristic of the psychiatric headache is the subjective experience of the quality of what might be called "closeness," as opposed to "remoteness," to the personality. The so-called functional headache has not so much, typically, the quality of a sensory perception as of an unpleasant experience with a special personal significance; whereas the typical quality of the organic headache is that of a sensory perception, about which the patient is able to assume a more or less detached attitude unless the pain is so intense (as in meningitis) as completely to pervade and overwhelm the whole being. Confirmation of this view of the difference in quality comes from the fact that patients who have suffered or who are suffering from both types of headache can usually distinguish between the two quite readily.

Localization.—I think this quality of "closeness to the personality," or special personal significance, is independent of the generalized or localized character of the headache (and "functional" headaches may be either), although it may help to explain why so many "functional" headaches are of a relatively diffuse kind. A possible explanation of the frequent localization at the base of the forehead between the eyes may be due to the fact that, according to Claparède (1924), this is where many of us localize our ego. It would be interesting to know whether blind people do so too, and, if not, whether blind neurotics are such frequent sufferers from headaches of this type. Again, localization to the front or back of the head may correspond to the vulgar divisions of the head in the popular mind, just as the band round the head may have its origin from our habit of wearing caps or hats. The reason for these localizations may hence correspond in principle to that of the glove and stocking distribution of hysterical anaesthesia, the particular localization in all instances being dependent upon the conceptions of the part held by the individual concerned. In other cases the type of headache seems to be derived from the type of emotional experience, as in the "pressure" headache of those who feel "oppressed."

ATTITUDE TOWARDS THE HEADACHE

This feature is really but another aspect of the quality of "closeness" to the personality or "personal significance" which has already been stressed. Hence the headache comes to be regarded in rather a special proprietary way as *my* headache, on to which, as also on to those who try to treat it, is often projected the same or similar emotions that were aroused by the emotional situation to which it owes its birth. Thus, as we all know, the doctor often finds himself used as a convenient vent for dissatisfaction.

DISTURBANCES OF FUNCTION

The characteristic feature here of the "functional" headache is the *selective* disturbance of function that is shown. Thus the complaint may be so severe as to prevent almost any activity; but sleep and appetite may remain unimpaired, and the capacity to perform unpleasant activities is usually particularly affected. Again, the complaint may be that the pain is so intense that the patient can think of nothing else and alleges total inability to concentrate. Yet objective tests for attention and memory may reveal no impairment; while the same examination of a sufferer from an organic headache who complains similarly will usually disclose definite defects.

THE REACTIVE QUALITY

Another very important point of differentiation comes from a study of the factors that influence the headache, when it will be found that the organic headache is influenced by such physical events as changes in posture; whereas the "functional" headache is typically only much influenced by psychological events, such as the arrival of a wanted or an unwanted visitor, or the prospect of being faced by a pleasant or an unpleasant task. These variations are often very obvious to the friends or relatives, who, not unnaturally, incline to take up the attitude that the neurotic patient is putting it on.

Is the Pain Real?—Although, as I believe, the "functional" headache has not typically the quality of a sensory perception, it is nevertheless an extremely real and unpleasant experience, as I for one know. To question whether this experience is a "real pain" seems to me to be playing with words. And indeed, as Muncie (1932) has pointed out in his fascinating study of those patients who complain of a sudden sensation of snapping or cracking in the brain—what he calls "psycholeptic" attacks—certainly this experience, when vivid enough, appears often to possess a definite sensory quality as a component of what I have stressed as the far more important attribute of intense personal significance.

2. The Past History

It will readily be understood that, since psychiatry deals with the total personality, the investigation of a single symptom, such as headache, can only usefully be undertaken in the light of the total setting in which it is shown. Again, considerable intelligence and rather special powers of introspection and exposition are necessary in order that the qualities that have been put forward as characteristic of the "functional" headache can be elicited, and many of our patients are not conspicuous for these gifts. I cannot but feel that Reilly (1926) was fortunate over his patients, whom he was apparently wont to ask, "Is it a real pain or hurt?" to which the "functional" patients replied "No," instead of "Eh, what's that?" or getting angry, as might have been expected. It is therefore essential to inquire carefully into the past history of each patient, and to obtain, wherever possible, an independent account from a friend or relation, who should be seen separately. An independent account often gives a very different complexion to what the patient has said.

This is no place to attempt a brief guide to the taking of a psychiatric history, but the following suggestions are put forward as very rough working rules.

Patients with Good Work Records and Personalities.—In such patients there is a prima facie case that the headache is of organic origin unless a history of special strain immediately preceding the onset of the headache is rather readily forthcoming. The main exceptions here are provided by those who are suffering from a mental illness (with associated headache) which is of constitutional origin, such as an endogenous depression; but in such cases other symptoms of the mental illness in question will also be shown. It is, I am sure, a great mistake to suppose that the sources of strain resulting in a "functional" headache are necessarily of a remote or complex kind, or in any true sense "unconscious." It must, however, be remembered that many patients will at first deny having been worried. They often feel that they should not have been worried, and therefore mistakenly say to themselves and to others that they have not. But a little questioning may readily reveal what has happened—namely, that the patient has been well enough aware of the sources of strain, but has failed to admit them to himself or to connect them with his headache, which is thus substituted for the original source of worry, only to become an additional source of worry in itself. I believe that a large number of anxiety states with associated headache clear up quite simply when the true sequence of events is made clear.

Patients with Poor Work Records and Personalities.—There is a very considerable chance that a headache is of "functional" origin in such patients, even if only a relatively trivial source of worry is forthcoming, or even if no obvious source of worry or strain is forthcoming at all after the most careful inquiry.

3. Associated Symptoms

It is not, I think, sufficiently realized that in the diagnosis of a psychiatric condition as much, if not more, can be learned from the type of reaction that is shown as from a study of those psychopathological factors that may have helped in its production; for, as I have already said, psychiatry is not solely a problem of psychogenesis. It is, of course, obvious that it will only be possible to deal in the most cursory manner with those associated symptoms that should suggest that a headache is part of a psychiatric syndrome.

Schizophrenia.—As Brown (1936) has pointed out in his valuable study of the "bodily complaint," or hypochondriasis, the headache or head complaint of schizophrenia can be of two types: that associated with anxiety or tension and of the non-specific "functional" type that has been described, and that distinguished by its characteristic bizarre and "symbolic" features. Thus a schizophrenic patient said to me recently that he felt not "as if" one side of his head was smaller than the other, but that one side of his head *was* smaller than the other, which he attributed to having his will power drained away by mystical forces. The description of the symptoms to be looked for in the early diagnosis of schizophrenia is an extraordinarily difficult task, but one which fortunately I need not attempt, as it has recently been so admirably performed in the readily available paper of Mayer-Gross (1938).

Organic Reactions.—It is surprising with what frequency the diagnosis of an early organic type of mental reaction, due to arteriosclerosis or other causes, is missed when the symptoms of anxiety or depression accompanying such reactions are so prominent as apparently to dominate the picture (Curran and Slater, 1935). Such patients are often thought to be suffering from a "functional" reaction in the production of which the emotional lability consequent upon organic changes frequently leads to the appearance of what is in fact a spurious psychogenesis, which further confirms this impression. Tests for memory, retention, and concentration will, of course, readily reveal the true state of affairs.

Affective Reactions.—A special difficulty arises in *depressive states,* because such patients often look physically ill, and show in addition the biological concomitants of depression, such as loss of weight, sleep, and appetite. The depressed mood may be thought to be due to the presumptive or assumed physical cause of the headache of which these patients so often complain, which hence may well become the centre of interest. Here again it is impossible to give a brief summary of the symptoms of depression, but reference may be made to the full and excellent description by Lewis (1934). A particular manifestation of affective reactions—namely, depersonalization—is, I think, another frequent stumbling-block, for such patients often complain primarily of their heads, and may not complain primarily or at all of their low spirits.

Anxiety states will, of course, often show some of the other and protean manifestations of anxiety, which cannot be gone into here, but which so often suggest the presence of physical ill-health and may thus lead to the same mistake as was mentioned in the case of depressive reactions.

The *hysterical* or purposive headache is often seen unaccompanied by other symptoms, and the main help must hence often come from points which have already been mentioned, such as the service of such headache in avoiding the fulfilment of unpleasant duties and tasks.

Some of these headaches are, however, very continuous and persistent, and particularly resistant to any form of treatment. It is interesting to speculate as to whether the intractable nature of a "functional" headache of this type as the sole complaint may not be associated with its location in the head, this being perhaps an indication of very deeply seated problems of the personality.

Physiological Component in the Production of "Functional" Headaches

The suggestion has been made more than once that "functional" headaches may, in part at least, be dependent upon the results of the physiological changes accompanying emotional disturbance, perhaps effected through the mediation of the vasomotor system. One does not, of course, doubt that structural or organic changes underlie or accompany all manifestations of function; but for myself I feel very dubious as to whether "functional" headaches are accompanied by, or have partly their origin in, physiological changes that will readily lend themselves to investigation. Thus I doubt whether these "functional" headaches are really analogous, in the mechanism of their production, to migraine, which I would regard as unquestionably a headache of organic type.

The studies of Wolff (1937) and others have, of course, demonstrated the importance of the psychobiological background and psychological factors in the production of many migrainous attacks. But these psychological factors appear to act as a trigger which fires off a train of organic

events; and for various reasons I very much doubt if the same underlying sequence can be postulated for the types of headache I have been considering here. I should much appreciate the views of others on this speculation.

Finally, I am very conscious of deficiencies, distortions, and omissions, and of the fact that this paper is full of the dogmatism and economy of truth which is perhaps inseparable from a brief presentation of such a colossal subject.

Summary

The recognition of headache as evidence of a psychiatric problem is discussed.

Positive points in the diagnosis of such headaches are put forward as a supplement to the principle of exclusion, so apt to be used alone.

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RESULTS WITH EPANUTIN IN MENTAL HOSPITAL PATIENTS

BY

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AND

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We have recently treated twelve epileptic patients in the Glasgow Royal Mental Hospital with epanutin (sodium diphenyl hydantoinate) in place of either sodium phenobarbitone or prominal. The drug was administered according to the advice of the makers (Parke, Davis and Co.) by gradual replacement of the drug already in use, and the changes in the frequency of fits or in the mental state were studied. The following notes give the results.

Case Reports

Case 1.—A man aged 30, whose first fit occurred eight years previously, has been three years in hospital. He is well preserved intellectually, with several characteristics of the epileptic personality, especially irritability and egocentricity. Major and minor attacks occur with about equal frequency. As he has ground parole and there is amnesia for the fits it is impossible to keep accurate account of the incidence. Before epanutin was given he was receiving in alternate periods of about six weeks either 1 grain of sodium phenobarbitone or 3 grains of prominal twice daily. These changes were usually followed by a considerable reduction in the number of fits for about two weeks and an associated improvement in his mood. Epanutin, one capsule (0.1 gramme) thrice daily, was given for sixty-four days. During the first month there was a striking diminution in the fits, and he was bright and enthusiastic about the new treatment. In the following five weeks, however, he had more fits than usual, twenty being recorded. He relapsed into his former state and requested that the drug be changed; no toxic effects occurred. On resuming prominal he had only seven recorded fits in the next twenty-five days.

Case 2.—A man aged 31 had his first fit when six years old, and he has been ten years in hospital. He is a deteriorated childish personality, with minor fits almost as frequent as major fits. Usually he is maintained on 3 grains of prominal twice daily. Epanutin, one capsule thrice daily, was given for thirty-six days, and was stopped because of increased irritability and difficult behaviour, though no other toxic symptoms were observed. There was a slight increase in the number of major fits and a diminution in minor attacks.

Case 3.—A man aged 46, whose fits began twenty years ago, has been thirteen years in hospitals. His personality is very deteriorated and his behaviour noisy, aggressive, and impulsive. Before the change to epanutin he was given 3 grains of prominal twice daily. On one capsule of epanutin three times a day the fits were less frequent, but the drug was stopped because of nausea and increased irritability.

Case 4.—A man aged 40, with fits during the past twenty years following a war injury, since when he has been in hospitals, has minor fits at long intervals and an occasional major fit. His personality is deteriorated, and occasionally he has attacks of vomiting with headache, though no signs of raised intracranial pressure are present. Epanutin, one capsule thrice daily, was stopped after thirty-six days when one of his vomiting attacks became unusually severe and prolonged. The vomiting disappeared shortly after the withdrawal of the drug; it is probable that the drug was causing an exacerbation of the usual attack. No change was observed in his mental condition, nor was there any significant change in the number of fits.

Case 5.—A man aged 40 whose fits started at the age of 10, has spent the last twenty-six years in hospitals. His mental condition is very deteriorated, his speech being incoherent. The fits are all major ones, and he is usually given prominal. Epanutin, one capsule thrice daily, had to be stopped after thirty-four days on account of nausea and refusal of food. There was no change in his mental condition, and his fits were more frequent.

Case 6.—A man aged 48, whose first fit occurred when he was 22 years old, has been in hospital five years, during which time he has shown progressive deterioration, with considerable memory defect, some confusion, and occasional outbursts of irritability. He has major fits, mainly during the night, at long intervals while on prominal. Each major fit is followed by about twenty-four hours of marked confusion. Epanutin, one capsule thrice daily, had to be stopped after nineteen days because of increased confusion and ataxia, which made it difficult for him to find his way about the ward and which prevented him from being able to feed himself. He was also much more dull and unresponsive than usual. The toxic manifestations disappeared a few days after withdrawal of the drug.

Case 7.—A man aged 55, whose fits began when he was 14 years old, has been thirty-four years in hospital. He is an extremely egocentric childish personality, vain and with numerous mannerisms, who has slightly more minor than major fits. Epanutin, one capsule thrice daily, was stopped on the thirty-seventh day of its administration when he developed an erythematous rash on his hands and legs which gradually spread over his body and which was accompanied by intense itching. Later, oedema appeared and was succeeded by an exfoliative dermatitis. There was no change in his mental condition, but the fits ceased during the epanutin period. The toxic manifestations were relieved by intravenous sodium thiosulphate.

Case 8.—A woman aged 51, with onset of fits in childhood, has been nineteen years in hospital and is now a somewhat deteriorated person with great irritability. Her attacks are usually major with occasional minor fits. Epanutin, one capsule twice daily, was given for fifteen days, when she refused the drug because of headache and nausea. There was an increased irritability, but there was no change in the incidence of the fits.

Case 9.—A woman aged 47, with a history of fits since infancy, has been twenty-eight years in hospital. She is fairly

well preserved mentally, with marked religiosity and spells of irritability. Major and minor fits are about equal in frequency, and she is usually given 1 grain of sodium phenobarbitone twice a day. Epanutin, one capsule twice daily, was maintained for sixty-seven days without any change in her mental state or in the frequency of the fits being noted. The drug was stopped when a vesicular rash appeared over the upper half of the right side of the trunk and spread down the right arm.

Case 10.—A woman aged 32 has had fits since the age of 9 years. She has been in hospital for four years and is a very demented personality. Major and minor fits are about equal in frequency. Epanutin, one capsule twice daily, has been given for sixty-eight days with no change in her mental status, but a diminution in the number of fits. No toxic effects developed.

Case 11.—A woman aged 53 has had fits for the past thirty-eight years, twenty years of which have been spent in hospitals. She is a depressed and rather demented bedridden woman whose fits, usually major, are infrequent. On the seventeenth day after epanutin, one capsule twice daily, was begun she asked to have the drug stopped because of headache, dizziness, and general malaise. It was noticed at the same time that a blotchy erythema had appeared on her legs.

Case 12.—A woman aged 49, whose fits began at the age of 13 years, has been in hospital three years and is now a noisy, excitable, and deteriorated personality. She was formerly given 1 grain of sodium phenobarbitone twice a day. As she became noisy at night after epanutin was substituted, she was given 1 grain of sodium phenobarbitone at nights in addition to one capsule of epanutin twice daily. There has been no change in her mental condition or in her fits after seventy-eight days of the epanutin, and no toxic effects developed.

Conclusions

Before drawing any conclusions it must be pointed out that these patients are a rather selected group. Most of them are over 40 years of age and have had a long history of hospitalization and a correspondingly long treatment with drugs. They were almost all admitted for psychotic behaviour as well as fits, and most of them were unsuitable for epileptic colonies, as they were unable to work.

The outstanding result of the treatment is the appearance of toxic effects, eight of the twelve cases showing these within a few weeks. They included headache, giddiness, nausea, loss of appetite, and ataxia. Three cases developed rashes, severe in two, with one being followed by an exfoliative dermatitis. These effects have already been referred to in connexion with this preparation (see references), but their frequent and early appearance obviously restrict the use of the drug, for though some are possibly not serious in themselves they antagonized these patients. One point perhaps worthy of note is that the three youngest patients showed no toxic effects.

In considering the mental effects we had only one patient who showed improvement, but this lasted for only a few weeks, after which he resumed his former state. It has also to be recalled that this patient showed a temporary improvement upon a change from sodium phenobarbitone to prominal or vice versa. The effect of the change to epanutin was rather more marked, however. His relapse followed upon the recurrence of fits, but the appearance of toxic effects in other cases made us reluctant to increase the dose. It would appear that in his case, as in some of the others, epanutin makes a useful addition to the drugs on which patients may be maintained for a few weeks. The absence of sedative effect proved an undesirable feature with several of our patients, as it released the excessive irritability and, in some cases, impulsive behaviour which was much relieved by the other drugs.

With regard to the anti-convulsant properties, the data are too limited to make critical observations. The table shows the number of fits to be expected during the period that epanutin was given, this being calculated from the average incidence of fits in the preceding six months in each case. As there appeared to be little change in the character of fits in most cases we have combined the major and minor attacks in the term "fit." It will be seen that there is a balance in favour of epanutin.

Table showing Summary of Results

Case No.	Age in Years	Duration of Epilepsy in Years	Change in Mental State during Epanutin Period	Period of Epanutin Administration in Days	No. of Fits in Epanutin Period	No. of Fits expected on Former Drugs	Reasons for stopping Drug
1	30	8	Brighter for 4 weeks	64	Not recorded		More fits than usual
2	31	25	Increased irritability	36	4	5	Increased irritability
3	46	20	,, ,,	34	2	4	,, ,, and nausea
4	40	20	No change	36	3	2	Vomiting
5	40	30	,,	34	13	10	Nausea ; refused food
6	48	26	Dull and unresponsive ; increased confusion	19	1	2	Confusion and ataxia
7	55	41	No change	37	0	4	Severe rash followed by exfoliative dermatitis
8	51	45	More irritable	15	3	2.5	Headache and nausea ; refused drug
9	47	46	No change	67	7	8	Vesicular rash
10	32	23	,,	68	3	5.5	Not stopped
11	53	38	,,	17	—	—	Rash, headache, and giddiness
12	49	36	,,	78	11	12	Not stopped

In short, our experience suggests that the drug is of use in the younger and better-preserved patients, but on account of its toxic effects it is advisable not to maintain it for more than a few weeks at a time.

We are indebted to Dr. Angus MacNiven, physician-superintendent of the Glasgow Royal Mental Hospital, for permission to give the treatment and to publish the results. We have also to express to Messrs. Parke, Davis and Co. our thanks for a trial supply of the drug and for advice.

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Muscular Dystrophy and Hypothyroidism.—In the issue of *Revue Neurologique* for May, 1939 (p. 513), P. Mollaret and J. Sigwald contribute a paper on "Generalized Muscular Atrophy of Rapid Onset in an Adult associated with Latent Myxoedema clinically cured by Thyroid Medication." In the same number (p. 548) G. Bourguignon also deals with the improvement effected by thyroid treatment of the condition. A case of generalized muscular hypertrophy without weakness or myotonia is described in a man of 56. The basal metabolic rate was − 13 per cent., and there were clinical signs of hypothyroidism. Biopsy showed no definite muscular abnormality. These symptoms, and also alterations in electrical excitability of the muscles, disappeared with thyroid medication. The literature on this condition is reviewed. The muscular changes are thought to be directly related to the hypothyroidism.

TREATMENT OF IRREDUCIBLE INTUSSUSCEPTION DUE TO MECKEL'S DIVERTICULUM

BY

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Intussusception occurring in adolescence as a result of an invaginated Meckel's diverticulum appears to be not uncommon. Hamilton Bailey (1938) says that it is so regularly the cause that a precise pre-operative diagnosis can be made. Harkins (1933), on the other hand, from a statistical study of the literature, concluded that a Meckel's diverticulum accounts for only a small proportion of intussusceptions, while Ladd and Gross (1934), at the Children's Hospital, Boston, found that fourteen out of 372 cases were due to an inverted Meckel's diverticulum. Harkins (1933) found that the great preponderance of cases occur in the first ten years of life, but Romanis and Mitchiner (1937) believe that enteric intussusception is usually seen in children between the ages of 3 and 10; that it is the second commonest variety; and that it is usually due to a Meckel's diverticulum or an intestinal polyp. No age, however, is exempt, and Nédelec (1937) describes a case in a woman aged 52.

Perrin and Lindsay (1921–2) in their analysis of a large series of cases of all types of intussusception found that the enteric variety has much the highest mortality. This type tends to be recurrent or subacute, and in consequence does not reach the surgeon until late. In addition, no difference exists in the calibre of the entering and ensheathing layers, such as is found in the ileo-colic variety. The combination of these two factors renders the enteric intussusception frequently irreducible.

The problem that confronts the surgeon when he opens the abdomen and finds himself face to face with an irreducible intussusception is one which has exercised the minds and ingenuity of many. Where the intussusception is irreducible but not gangrenous Rowlands and Turner (1937) advise restoring the continuity of the canal by a short-circuit anastomosis, and leaving the mass in the abdomen; and they add—referring to infants—that recovery after resection of a gangrenous intussusception is a very rare event. Romanis and Mitchiner (1937), however, say that performance of a short circuit above and below the intussusception, while relieving the obstruction, still leaves the possibility of gangrene occurring with peritonitis. This latter teaching is supported by the figures given by Perrin and Lindsay (1921–2), in whose series the only treatment that was attended by any success was excision with end-to-end or lateral anastomosis. And Clubbe (1921) makes a plea for more frequent excision.

Elliot-Smith (1935) reports three very interesting cases of irreducible intussusception, in which he did a lateral anastomosis and returned the tumour to the abdomen, with or without suturing the neck. All three patients recovered. He says that peritonitis, even in fatal cases untreated by operation, is rare, as the gangrene is limited to the intussusceptum, and the ensheathing layer is usually healthy. Illingworth and Dick (1938) also consider that the vitality of the sheath is seldom imperilled.

The case that is now reported is instructive because it illustrates the danger of leaving behind in the abdomen an irreducible intussusception, which may at any moment become gangrenous and prove fatal.

Case Report

A girl aged 9 was admitted to hospital as a case of acute appendicitis. There was a history of previous attacks of abdominal pain in the right lower abdomen since she was 6 years of age, occurring at intervals of about six months, each time more severe, and lasting for about two hours or longer. There had never been any vomiting until this last attack, which had begun on the evening of the day before admission. There had been no constipation up to the onset of the pain, but she had not had her bowels open since then, nor had she passed any blood or mucus per rectum. She had never been seen by a doctor during her previous attacks, which had always subsided spontaneously and left her quite well.

On examination she was a well-nourished sturdy child, but somewhat pale. The pulse rate was 116, the temperature 99. While she was being examined she was obviously having spasms of colic, and cried out with the pain. The abdomen was slightly distended, but not rigid. There was a mobile horseshoe-shaped tumour, lying more or less equally on either side of the umbilicus.

Operation.—Under gas-oxygen-ether, the abdomen was opened by a midline subumbilical incision. The intussusception presented at once, and was readily delivered into the wound. It consisted of the terminal portion of the ileum, which had become bent until it occupied three-quarters of a circle, and measured about ten inches in length. The ends of the limbs were quite close together, and extended down to the base of the mesentery. It was quite irreducible. The sheath was healthy and showed no visible signs of gangrene. A lateral anastomosis was performed between the entering and the ensheathing layers an inch or so beyond the extremities of the loop, and the mass was returned to the abdomen. Two days later the pulse and temperature were rising, and the child was having pain. The abdomen was reopened through the original incision. There were patches of gangrene on the sheath of the intussusception. It was withdrawn from the abdomen, and, in manipulating it, the gangrenous areas gave way and spilled foul contents. The whole loop was excised, leaving the anastomosis intact, and the ends were crushed and invaginated.

During the next few days the child passed first a little blood per rectum, and subsequently loose stools. Her condition improved, and, apart from a slight infection of the anterior abdominal wall, she made an uneventful recovery.

DESCRIPTION OF SPECIMEN

The portion of bowel resected was the last twenty inches or so of the ileum. That portion of the bowel which formed the sheath was gangrenous. Within the inner layer, and forming the apex of the intussusception, was a completely invaginated Meckel's diverticulum. It was three inches long, and at first sight was mistaken for an intestinal polyp. In structure it resembled normal small intestine, and was everted without difficulty.

Discussion

This case very clearly proves the danger of leaving behind an intussusception, even though at the time the ensheathing layer appears to be healthy. Such a course may apparently be taken on occasions with impunity, but it seems quite an unjustifiable risk. The extra time needed to excise the tumour and invaginate the ends after the anastomosis has been completed is so small that it cannot materially add to the shock of the operation. If an excision is undertaken it is technically easier and quicker to perform the (lateral) anastomosis before amputating

the tumour, just as, in a partial gastrectomy, it is easier to anastomose the stomach to the jejunum before amputating the stomach.

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THE DIAGNOSIS AND TREATMENT OF INFANTILE MASTOIDITIS

BY

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In winter a children's hospital contains many cases of severe air-borne infection—influenza, bronchitis, pneumonia, etc. In summer food-borne infection—diarrhoea and vomiting—is more commonly seen. In both summer and winter many bottle-fed infants are admitted. With suitable treatment and feeding a majority of these cases recover without complication. Some patients, however, perhaps after a temporary improvement, begin to go downhill mysteriously, lose weight rapidly, and die. In such cases, although during life the physical signs usually associated with mastoiditis, such as discharge from the ear and swelling behind it, were absent, yet a post-mortem examination has frequently revealed the presence of a purulent mastoiditis on one or both sides. Thus investigation of the records of 146 recent consecutive necropsies revealed that mastoiditis undiagnosed in life had been present on one or both sides in no fewer than twenty-nine cases. It is clear, therefore, that unsuspected mastoiditis is a common and often fatal complication, developing insidiously during the course of the above diseases.

The frequency with which mastoiditis complicates the above diseases has not been sufficiently realized: the reason for its development is to a certain extent shrouded in mystery, and since the physical signs which point to its presence are often masked by those of the disease from which the child is suffering, some confusion exists with regard to the diagnosis.

In order to clarify the problem it is proposed to discuss it under the following headings, pointing out: (1) the extreme frequency of mastoiditis as a complication in the above diseases; (2) the method by which infection gains access to the mastoid antrum and the material which causes it in each disease; (3) the local and general physical signs by means of which diagnosis can be made with confidence; (4) the treatment which experience has shown to be effective; (5) certain nursing details which have been found useful in prevention and helpful in promoting spontaneous recovery.

Frequency

At the Royal Liverpool Children's Hospital during the last six months mastoiditis has been recognized as a complication in thirty-six cases of children suffering from one or other of the above diseases. All were referred to the laryngologist by the courtesy of the physician or surgeon in charge, and in nearly all of them the classical physical signs usually associated with mastoiditis were absent.

Method of Infection

We must remember that the Eustachian tube is more horizontal in children than in adults, and that normally it opens with each act of deglutition. On account of this horizontal position any material in the post-nasal space finds its way through the Eustachian tube into the tympanum and thence to the mastoid antrum more easily than in adults—especially when the child is lying on his back while feeding. It is thus seen how easily infected mucus can enter the tympanum from the post-nasal space in air-borne disease, and how vomited material may do so in food-borne disease and milk in bottle-fed infants.

Diagnosis

We have seen that diagnosis is often obscured not only by the physical signs of the disease from which the child is suffering but also by the fact that those usually associated with mastoiditis are absent—for example, as a rule there is no discharge from the ear, and swelling behind it is never present at a stage when, in the interest of the child's life, treatment is imperative. Moreover, the child is too young to tell us that he has earache, and palpation over the mastoid process gives us no definite help. Nevertheless experience has shown that mastoiditis can be recognized in these children at an early stage by the presence of local physical signs, other than those usually associated with mastoiditis, in conjunction with considerations in regard to the child's general condition.

General Considerations

In the first place the child is suffering from an air-borne or food-borne infection or is a wasted bottle-fed infant. We have seen that in these illnesses mastoiditis is a common complication. If, therefore, such a child is not improving, mastoiditis is likely to be the cause and should always be suspected. Further, it may be that for the last two or three days an increase in the temperature has been noted. Perhaps the child has been crying out as if in pain. The nurse may have noticed that he has been putting his hand to his head or pulling at his ear or rolling his head on his pillow. Diarrhoea and vomiting may have increased or, if not present, have now appeared, leading to rapid loss of weight and dehydration.

Local Physical Signs

A discharge from the ear is seldom present, but examination with the electric auriscope may reveal a pool of pus too small to appear outside. Often the tympanic membrane is pink, especially in the upper and posterior quadrant, or it may only show a loss of lustre or a wrinkled appearance like a piece of crushed tissue paper. Frequently nothing abnormal is seen.

There is, however, one physical sign which is constant—one that has not received the attention it deserves. It consists in the presence of a palpable gland or glands in the posterior triangle of the neck behind the sterno-mastoid muscle. The glands in this region are often easily palpable, but sometimes difficulty is experienced in detecting them, for they are small at first, but increase in size with the chronicity of the mastoid infection. It is therefore to be expected that at an early stage the glands are more difficult to find than at a later date. There are, of course, other conditions which produce enlargement of the glands in the posterior triangle of the neck, such as

sepsis in the area of skin the lymphatics of which drain into the glands. But of all the conditions causing enlargement, mastoiditis in its catarrhal or purulent stage is by far the commonest. In the event, therefore, of glands being felt in this situation, and having excluded other causes, mastoiditis should always be suspected.

When this suspicion is strengthened by the presence of one or other of the above local signs and by the fact that the child is suffering from any one of the above diseases, experience has shown that a diagnosis of mastoiditis can be made with almost absolute certainty. Having made the diagnosis it is not suggested that an immediate operation is necessary in every case, for it has been found that in some instances mastoiditis in its early stage subsides spontaneously. Immediate operation is necessary only in the case of a child whose general condition is not improving, and who is losing weight and becoming dehydrated. In such a child operation is urgently called for in the interest of his life.

Treatment

About fifteen years ago the appalling mortality among young children in whom the mastoid cells showed unsuspected disease at necropsy led to a determined effort to recognize the condition during life and to adopt treatment at an early stage in the disease in the hope of saving the lives of children who would otherwise die. At first paracentesis was tried in those in whom the tympanic membrane showed changes. This proved unsatisfactory, for although some cases improved for a time, yet most of these patients died, and purulent mastoiditis was found post mortem. Gradually more and more were subjected to mastoidectomy, with the result that many children who were expected to die made a spectacular recovery.

Both now and for several years past the diagnosis is and has been made in the way outlined above, and if the child is losing weight or going downhill an immediate exploration of the mastoid is advised and carried out. The operation is an extremely simple one, and can be completed in less than ten minutes. It consists in opening the mastoid antrum and any cells which may be present, and leaving the lower part of the wound open so that drainage may take place posteriorly. The typical condition found at operation in an early case consists in the presence of swollen polypoid mucous membrane filling the antrum and any cells which may be present. At a later stage the polypoid mucous membrane is seen to be bathed in muco-pus; later still, frank pus is found, with destruction of bone. Experience has shown that, in mastoiditis due to air-borne infection, pus and bone disease are more likely to be found than when it develops as a complication in food-borne infection or in wasted bottle-fed infants.

We have seen that the complication is often bilateral, and as most of the children are critically ill it is not always a safe risk to operate on both sides at the primary sitting. We must therefore decide by the physical signs on which side to operate first. The rule is to choose that side on which the posterior glands are the larger or that on which the tympanic membrane is the more abnormal—with one exception. In a bilateral case, if one ear is discharging and the other dry it has been found safer to choose the latter ear for the primary operation; for on the discharging side the mastoid cells are draining and on the dry side the infection is pent up.

Nursing Details

We have seen above how readily muco-pus, vomit, or milk can enter and infect the mastoid antrum while the child is lying on his back, and especially while being fed in this position. It is suggested, therefore, that children suffering from air-borne infection, diarrhoea, and vomiting, or wasted bottle-fed infants, should never be fed while lying down, and that during the intervals of feeding they should be well propped up on pillows and constantly turned from side to side—and never be allowed to lie on their backs for any length of time. The routine adoption of these suggestions at the Royal Liverpool Children's Hospital has not only led to a definite decrease in the frequency of mastoiditis as a complication in the above diseases, but has also proved itself to be a potent factor in promoting spontaneous recovery in those cases as yet not ill enough to require operation.

An analysis of the case sheets of the thirty-six cases mentioned above brings out the following interesting facts.

Enlarged glands in the posterior triangle were present in every case. In seven cases the tympanic membrane appeared normal. In twenty-three cases the tympanic membrane was abnormal or pus was present in the meatus. In six cases there is no note as to the appearance of the tympanic membrane. Seven cases recovered spontaneously. Twenty-nine cases were operated on, either on one or both sides, mastoiditis in the catarrhal or the purulent stage being present in all. Eight of these patients died (27.5 per cent.). Twenty-one recovered (72.5 per cent.).

All the cases subjected to operation were critically ill, some apparently in the last stages of dehydration, which even intravenous salines had failed to improve. When this is realized a recovery rate of 72.5 per cent. must be considered eminently satisfactory, for, unless the complication is recognized and treated, death is almost certain.

Conclusions

That many children considered to have died from one or other of the above diseases do in reality succumb to unrecognized mastoiditis.

That this complication occurs with much greater frequency than is generally realized.

That diagnosis even at an early stage can be made with confidence.

That mastoidectomy will save the lives of about 70 per cent. of the children in whom the complication is present.

That young children should never be nursed or fed lying on their backs.

Summary

The frequency with which mastoiditis complicates other diseases in children is stressed.

The diagnosis and treatment of the condition are detailed.

Nursing precautions which lead to a decrease in the incidence of mastoiditis in child patients are given.

An analysis is made of the case sheets of a series of thirty-six such cases occurring at the Royal Liverpool Children's Hospital.

In *La Presse Médicale* for June 28, 1939 (p. 1031), Desmarest and Capitain discuss the value of testosterone treatment in menorrhagia, metrorrhagia, and menopausal disturbances. They describe a number of cases of metrorrhagia and menorrhagia in young women and in women at the menopause, and also certain cases of post-menopausal disturbances which they have treated with testosterone propionate with excellent results. In uterine haemorrhage they give testosterone alone, while in amenorrhoea they combine it with small doses of folliculin.

Clinical Memoranda

Artificial Restoration of Cardiac Rhythm

The following case, in which restoration of cardiac rhythm was successfully produced by artificial means, presents several features of interest.

Case Record

A man aged 72 was admitted to hospital suffering from obstructive jaundice. Examination revealed an enlarged heart and auricular fibrillation. As, however, the biliary obstruction was complete it was decided that after the intravenous administration of glucose and calcium gluconate an operation should be performed. Spinal anaesthesia, using 1 in 1,500 percaine, was induced, and was supplemented by gas-and-oxygen administered by means of a McKesson apparatus. Shortly after the peritoneal cavity had been opened respiration ceased, and it was found that the heart had stopped. An incision was made in the left cupola of the diaphragm, and a hand was inserted into the pericardium. The heart was "massaged," or, rather, compressed and allowed to relax at regular intervals. Meanwhile, the anaesthetist carried out artificial respiration by means of intermittent compression of the reservoir of the McKesson anaesthetic apparatus. After a few minutes the heart beat spontaneously for about a dozen beats and then ceased. After another interval some further spontaneous contractions took place, again ceasing. Twenty minutes from the moment that the heart first ceased to beat it was felt that no further efforts would be of any use.

A "post-mortem" examination of the bile ducts and duodenum was carried out before closing the abdomen. An assistant then took this opportunity of practising cardiac massage, and twenty-nine minutes from the time that the heart first ceased to beat contractions were again produced; these continued. In a few minutes strong regular beats could be felt at the wrist, and peripheral circulation had been established. The abdomen was closed. Spontaneous respiration had not, however, been re-established, and artificial respiration was continued.

It was thought that prolonged cerebral anoxaemia had produced paralysis of the whole brain, including the respiratory centre in the medulla, and it was hoped that if an adequate circulation of oxygenated blood could be maintained for a sufficiently long time some degree of recovery would take place. Two and a quarter hours after the operation the first spontaneous respiration occurred. This was succeeded in five minutes by a second and then a third. At this time the patient showed complete flaccidity of all voluntary muscles and absence of all reflexes. The respirations were slow, gasping in character, and completely irregular.

Within an hour marked changes had occurred. The patient now presented the typical picture of decerebrate rigidity: the arms were flexed across the chest, with the wrists and fingers flexed; the knees were extended, and the ankles in the position of plantar flexion. The respiratory rhythm was now characteristic of that described by Lumsden as apneustic. The only further change in the patient's condition was that respiration later became more normal in rhythm. The man "died" eighteen hours after operation.

Discussion

The opinion is generally held that restoration of cardiac rhythm can occur up to fifteen minutes after the heart has stopped. In the above case an interval of twenty-nine minutes elapsed. While this may be explained by assuming that cardiac massage itself can maintain some sort of circulation, the case does show that even more prolonged efforts should be made.

The recovery of the centres in the brain stem occurred in accordance with the known fact that the lower and more primitive centres show an increasing resistance to prolonged anoxaemia and, similarly, a more rapid recovery than the higher centres. Lumsden suggests that the respiratory centre can be divided into three sub-centres as follows: in the upper medulla just below the striae acousticae is the gasping centre; just above this is the apneustic centre, which is primarily responsible for the inspiratory movement; and, lastly, in the region of the upper pons is the pneumotaxic centre, which normally checks the activity of the apneustic centre and is responsible for the production of the normal respiratory rhythm. When an animal dies from asphyxia or from any interference with the blood supply to the brain stem these three parts of the respiratory centre suffer in turn in a descending order. Recovery occurs in the reverse order. This process of recovery was exactly demonstrated in our patient.

A similar ascending recovery was shown by that part of the central nervous system which controls muscle tone. At first the patient presented complete muscular flaccidity such as would be produced by transection of the medulla below the lateral vestibular nucleus of Deiters. Later the picture was that of section through the midbrain or pons above Dieters's nucleus and below the middle third of the red nucleus. No recovery of any centres above this level occurred.

I am indebted to the late Mr. J. L. Joyce for permission to publish this case.

Reading. Gordon L. Bohn, F.R.C.S.

Epanutin in Epilepsy

Epanutin (sodium 5:5-diphenyl hydantoinate), although a comparatively new drug, is evoking increasing interest among clinicians treating epilepsy. As yet, however, reports on its clinical trial are of necessity scanty. An account, therefore, of experience with this form of treatment extending over some months may be of interest.

The original claim of Merritt and Putnam (1938) that epanutin is of value in controlling major epileptic seizures seems to be undoubted. That it is the treatment of choice in all or most cases of epilepsy does not appear to be so certain. As with many other drugs exerting a powerful effect on bodily functions, epanutin has considerable toxic action. This, though not necessarily a bar to its use, necessitates care and watchfulness, and it seems unlikely that it will supersede, at present anyway, the more time-honoured treatment with luminal and the bromides for continuous general use. Already a number of toxic effects have been noted, ranging from nausea, vomiting, and epistaxis to various skin rashes, hypertrophy of the gums, and marked ataxic symptoms. This last complication is particularly dangerous, as it tends to come on insidiously after a considerable period, and may easily be thought by the unwary to be due to the epilepsy and therefore be taken as an indication for continuing the drug or even increasing the dose.

In the present series of cases toxic effects have been comparatively few, possibly because the dose used has not been large. Skin rashes of morbilliform type occurred during treatment in two cases. These cleared up on discontinuing the drug. One patient, unfortunately, started to have severe fits as soon as treatment was stopped and died within a week from status epilepticus, in spite of all the recognized forms of treatment. Such an event seems

to be an indication for substituting other drugs before omitting epanutin. No cases of pronounced ataxia have occurred, but slight tremor of the hands and face has been observed, and numbness and tingling of the hands and feet have been complained of with some frequency. Transient nausea seems to occur fairly often, and constipation may be troublesome.

The initial dosage in every case was one capsule (0.1 gramme) three times a day, increased later to four capsules a day in a few instances. The number of fits was in most cases greatly reduced, some patients having no fits at all for long periods, but in a few cases little or no effect on the seizures was apparent.

Table showing Monthly Incidence of Fits before and during Treatment with Epanutin

Case	Month prior to Epanutin	Months of Treatment						
		1	2	3	4	5	6	7
A	8	0	3	0	2	4	0	1
B	23	1	1	2	12	0	6	6
C	19	0	0	0	23	5	6	—
D	10	0	0	0	0	0	0	—
E	27	7	0	0	1	0	0	—
F	4	8	7	8	7	18	—	—
G	21	1	0	4	3	2	—	—
H	5	2	3	5	—	—	—	—
I	9	0	0	0	—	—	—	—
J	1	3	4	—	—	—	—	—
K	4	2	0	0	—	—	—	—
L	2	0	2	0	—	—	—	—

In cases B and C the increase in the number of fits in the fourth month was due to a sudden exacerbation in spite of treatment. Cases F, H, and J are examples of failure to respond at all to the drug. In evaluating results it must be remembered that even cases of untreated epilepsy tend to show great variation in the incidence and periodicity of the fits, and that many factors, even, possibly, the change in treatment itself, may have some effect on the number of fits.

In those cases which responded well, however, marked improvement was noted in other spheres. Bodily and mental health were both improved, the latter possibly being associated with the absence of the soporific effect produced by such drugs as luminal and the bromides. This feeling of well-being was pronounced in a considerable number of cases—weight was gained, appetite improved, and zest for occupation increased. All these factors in addition to the diminution in fits are of great benefit to the patient. Therefore the conclusion arrived at is that although epanutin is possibly not the ideal drug in the treatment of epilepsy, it is nevertheless of considerable value in the control of fits and is well worth further trial in selected cases, especially where the treatment can be supervised. Further research along similar lines may well yield an even more suitable substance.

I wish to thank Dr. W. D. Nicol, medical superintendent of Horton Hospital, Epsom, for his kindness and permission to report these cases.

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REFERENCE

Merritt, H. H., and Putnam, T. J. (1938). *J. Amer. med. Ass.*, 111, 1068.

Reviews

EVERYDAY TREATMENT

Treatment of Some Common Diseases, Medical and Surgical. By Various Authors. Edited by T. Rowland Hill, M.D., M.R.C.P. (Pp. 398; 90 figures, some of which are in colour; 3 tables; 15s. net, postage 6d.) Edinburgh: E. and S. Livingstone. 1939.

Dr. T. Rowland Hill has collected a series of contributions by members of the staff of the Southend General Hospital on the methods of treatment of some of the common medical and surgical complaints, and the result is a book which will be valuable to practitioners. The range of subjects chosen is a wide one, and the method of approach is through a short reminder of the pathology of the condition under consideration. The volume is readable, the illustrations good and sufficient, and the book may be recommended as a sound statement of present-day therapeutics. A good start is made with two articles, on the treatment of angina pectoris and of heart failure, by Dr. William Evans, who summarizes his careful observations on the efficacy of various drugs and indicates the occasions for their use. The editor is responsible for two chapters on anaemia and on cerebral vascular disease. In the former he offers a classification which will be useful to practitioners in deciding the nature of the anaemia and so ordering the appropriate treatment. Cerebral vascular disease, in its different varieties common in infancy and in old age, tends to be overlooked in the early stages in the middle-aged when rest and treatment may bring about compensation. Pleurisy and the various types of bronchopulmonary suppuration from catarrh to bronchiectasis are discussed by Dr. Sleigh Johnson. Dr. J. N. O'Reilly gives a useful sketch of the diagnosis and treatment of the commoner digestive disorders of childhood, preceded by a short but complete summary of the feeding of the normal infant, whether breast or artificial feeding is used.

Dr. L. T. Bond gives a fair summary of the present position of the prophylactic treatment of infective diseases by active immunization. At present there is rather a slump in vaccine therapy since the wave of optimism following the introduction of comparatively non-toxic chemotherapeutical compounds, and, as Dr. Bond points out, there is still a long way to go before it can be said that protection can be afforded against the majority of bacterial and virus diseases. Dr. R. H. Campbell deals with the treatment of haemorrhage from peptic ulcers on the lines advocated by Meulengracht, and points out that the initial nausea may often be overcome by persuading the patient to make a beginning with food, because once some food is retained the peristaltic action of the stomach tends to move on the blood clot and nausea ceases. Supporting intravenous therapy of one kind or another is so important that every medical practitioner should have available the material and apparatus for this immediate and life-saving measure when called to sudden and severe haemorrhages.

Among the surgical subjects the practitioner will find Sir William Wheeler's survey of the present position in regard to the management of enlarged prostate a most useful guide in advising and treating his patients, and Mr. Barlow's on suppurative lesions in the neighbourhood of the knee-joint and on infections of the face and neck, both of which if not dealt with adequately may bring about complications dangerous to life. Mr. Knight deals with head injuries and their complications, and Mr. S. G.

Mayer with post-operative complications of wounds in general. The problems of earache and dental caries as met with in general practice receive attention, and some common skin lesions. There are chapters on the management of delay in labour and of the various causes of abnormal uterine haemorrhage. Dr. G. White Phillips gives a short description of the effects of *x* rays on dividing cells. The dose must be above a certain minimum and varies for different cells; the approximate cancericidal doses are now known for certain malignant tumours. The methods of application and effects of treatment are discussed. Excision is the method of choice except in epithelioma of the lips and of the anterior third of the tongue. Excision must, of course, include the neighbouring lymphatic system. In inoperable cases radiation is the only form of treatment; the results of treatment by deep *x* rays in a number of cases with varied conditions are described and illustrated; unfortunately, injury of the skin and deeper tissues may occur; these effects, their treatment, and the sequelae are shortly indicated. Shock during anaesthesia and the means of meeting it and the newer methods of pre-anaesthetic medication are discussed.

In a notable article Mr. Wilfred Trotter makes a plea for earlier diagnosis of malignant disease of the pharynx. Though not common, its earliest symptoms are so mild, its advance so insidious, and its consequences so devastating that the practitioner is urged to take more notice of the complaints of patients with persistent throat symptoms; especially to learn the use of the laryngoscope, by means of which changes in the arytenoids may be seen or excluded; in the event of any suspicion of trouble expert opinion is to be sought. The details of treatment are explained and illustrated, but much will be gained if early diagnosis enables treatment to be instituted at a time which should at least ensure the level of success reaching that of any other cancer.

HEALTH ADMINISTRATION

Health Officers' Manual. General Information regarding the Administrative and Technical Problems of the Health Officer. By J. G. Geiger, M.D., Sc.D., LL.D. (Pp. 148; illustrated; 6s. 6d. net.) London: W. B. Saunders. 1939.

The medical graduate or licentiate, during the courses which he pursues in order to fit himself to hold a position as a medical officer of health, is required in this country to devote his attention to a couple of study groups, in the latter of which is included the study of health administration. This subject usually appeals to him as wide but vague, and, as an onlooker at this stage with no direct responsibility, he is apt to think administration an easy and not very urgent matter, a capacity for which he will develop automatically whenever the need arises. But when the need does arise and he becomes a medical officer, no longer a spectator but an active agent responsible for the health destinies of a community, he is likely enough to make the discovery that administration is not so easy after all, and so to welcome a guiding hand, especially if proffered by one who has competently trod the way before him. Such guidance is usefully made available to medical officers of health in a recently issued work by Dr. J. G. Geiger of San Francisco, who, adopting his own area as the pattern, exhibits the practical organization and interrelations of the manifold components of an important public health department. He believes in effective contacts between the health section and the other activities of the local authority. He thinks it well that the medical officer should be supported by an advisory board, so composed as to represent all significant local interests. He approves, also, of a technical advisory board, including medical men. Publicity is to him an obligation which he owes to the community, and he favours political relations if of a productive kind. Among many other topics aptly presented in the book are mental hygiene, the inspection of restaurants, hospitals, housing, camp sites, and the limitations of laboratory diagnosis.

GYNAECOLOGY AT JOHNS HOPKINS

Collected Papers by Members of the Gynecological Department of the Johns Hopkins Hospital and University, 1929–38. Volumes A and B. The Johns Hopkins Hospital. 1939.

The Johns Hopkins Hospital celebrated its fiftieth anniversary on May 7, 1939. On that day Dr. Thomas S. Cullen, professor of gynaecology, Johns Hopkins University, and visiting gynaecologist, Johns Hopkins Hospital, signed the preface to the two volumes of collected reprints of 122 articles which represent the published work of the department of gynaecology for the years 1929–38 inclusive. The addition of these volumes to the three existing ones makes a complete record of all the work published by the department since 1916.

"A father is proud of his sons and a surgeon may admire his own handiwork. Both are usually guilty of exaggeration," writes Dr. Lawrence Wharton at the beginning of an article in which he describes a new technique for constructing an artificial vagina (reprint 117). No exaggerated pride is revealed, however, by Professor Cullen in the simple preface to these volumes when he writes: "My affectionate regards and sincere thanks go to all members of the gynaecological staff for their admirable co-operation, their unflagging energy, and for what in these volumes they have added to our knowledge of gynaecology and abdominal surgery." The contributions that have been made by this department in the last ten years are very considerable, and for that reason the record made by the collected reprints is a valuable one. Novak, who must be regarded as one of the most eminent living authorities on gynaecological pathology and endocrinology, has contributed numerous papers on these subjects, with special emphasis on the clinical applications of advances in knowledge. His articles, which are always stimulating and a delight to read, have played a tremendous part in informing the profession, both in America and abroad, of progress made. They have also been an encouragement to other workers to continue in the search for truth. The epoch-making work of Hunner on the subject of the urinary tract has done much to draw attention to the important relationship that can exist between genital and urinary lesions, and his articles on ureteral strictures have been of the greatest importance to clinical gynaecology.

Space permits only of mention of other workers, such as Wharton and Richardson, whose contributions have been most valuable. One of the outstanding publications in the series is the article on "Lesions of the Rectus Abdominis Muscle simulating an Acute Intra-abdominal Condition" by Cullen and Brodel (reprint 106). It is certainly the classic in English on this subject, and is a model of how such a paper should be arranged and written. Many in this country will remember with great appreciation the address on "The Training of the Gynaecologist" read by Dr. Cullen to the Section of Obstetrics and Gynaecology at the Annual Meeting of the British Medical Association held at Manchester in 1929. They will recall that in his opinion "the finished product is (1) a man who has a good knowledge of general pathology and an intensive knowledge of gynaecological patho-

logy, (2) a man with a comprehensive knowledge of gynaecological and abdominal diseases, (3) an expert gynaecological and *abdominal* surgeon, (4) a surgeon who has formed the habit of looking at his cases from every viewpoint."

The collected papers of men who are the products of such a system of training are a glowing tribute to the way in which Dr. Cullen's ideals are achieved in practice. It is fitting that these volumes should be concluded by a record of the testimonial dinner given in honour of Dr. Cullen on the occasion of his seventieth birthday, a dinner at which tribute was paid by a gathering of 480 guests to a great gynaecologist, an inspiring and generous leader, and a man whose genius is excelled only by his humanity.

RELIEF OF PAIN

The Relief of Pain: A Handbook of Modern Analgesia. By Harold Balme, M.D., F.R.C.S., D.P.H. With an Introduction by Sir E. Farquhar Buzzard. Second edition. (Pp. 399. 12s. 6d.) London: J. and A. Churchill. 1939.

From time to time books appear dealing with a particular symptom and its treatment, and may be snapped up, perhaps too readily snapped up, by the busy practitioner who hopes he has found an easy road to therapeutic reputation. Too often he is disappointed, because symptomatic treatment can never be really satisfactory. That a second edition of this book has been called for in two and a half years shows that it has met a demand. It has certain merits that no doubt account for this. While comprehensive it is brief, making no attempt to enter into an erudite discussion of the whole of medicine; it from first to last insists that removal of the cause must be the only satisfactory way of removing pain, and it is well documented with plenty of references to facilitate further study. It will, of course, meet with criticism: the specialist reads such a book and finds it admirable in all specialties except his own, where he regards it as incomplete and insufficiently critical, and that, of course, is its danger. In bringing it up to date the author is forced to accept statements of enthusiastic supporters of some new surgical or pharmacological procedure which has not yet stood the test of time. Nevertheless this new edition is to be welcomed as a book of reference and as a stimulus to critical experiment in the use of various methods to give to the patient what he most craves for—relief from pain and suffering, whatever may be their cause. An excellent chapter is contributed by Miss Houghton on the nursing of pain.

BACTERIOLOGY

The Anaerobic Bacteria and their Activities in Nature and Disease. A Subject Bibliography. Volume I: Chronological Author Index. Volume II: Subject Index. By Elizabeth McCoy and L. S. McClung. (Pp. 295 and 602. 50s. net for two volumes.) London: University of Cambridge Press. U.S.A.: University of California Press. 1939.

Bacteria: The Smallest Living Organisms. By Dr. Ferdinand Cohn. Translated by Charles. S. Dolley. Introduction by Morris C. Leikind. (Pp. 44; 4 figures; frontispiece. 1 dollar.) Baltimore: Johns Hopkins Press. 1939.

Elizabeth McCoy and L. S. McClung have performed an unusual and valuable service to the science of bacteriology in compiling two large volumes entitled *The Anaerobic Bacteria and their Activities in Nature and Disease. A Subject Bibliography.* The material on which these volumes are based consists of about 10,500 separate references to original publications on this large subject. In the first volume these are arranged chronologically and alphabetically under the names of their authors; in the second they are very fully classified according to the aspect of the subject with which they deal. This elaborate and convenient method of presentation expands the original material into no fewer than 120,000 entries. The authors declare their intention of publishing further supplementary volumes in the future which will bring the publication up to date if the demand justifies this. Anyone seeking complete information from original sources on any matter within the scope of this compilation will have cause to thank the authors for making the task so easy.

A paper by Ferdinand Cohn published in 1872 entitled "Uber die Bacterien, die Kleinsten Lebenden Wesen" was translated and republished by Dr. Charles S. Dolley, then of the University of Pennsylvania, in 1881. This translation, together with brief biographical notes on the author and translator, has now been republished, and forms a useful addition to the few classical early papers on microbiology now made more easily accessible. Cohn's grasp of the significance of the subject was highly enlightened for that time, and among the ideas he puts forward is the possibility that life originated on the earth by the interplanetary transference of bacteria, a not impossible conception which was seriously discussed half a century after he wrote these words.

Notes on Books

Sir Edward Mellanby, Secretary of the Medical Research Council, delivered at Cambridge, on April 28, the Robert Rede Lecture, taking as his subject "Recent Advances in Medical Science: A Study of their Social and Economic Implications." An abridged version of this lecture appeared in the *Journal* of May 13 (p. 996). The lecture itself has now been published in full in booklet form (Cambridge University Press, 2s. 6d.). It concludes with these words: "There is no limit to the amount of knowledge to be gained if the medical scientist is given the opportunities and facilities for his work. Would that the same could be said about the wisdom necessary to make the best use of this knowledge!"

Comparative Studies Concerning the Strengths of Oestrogenic Substances by Dr. K. Pedersen-Bjergaard of Copenhagen is a monograph of 198 pages which gives an account of extensive experiments carried out by the author on the biological standardization of oestrogenic compounds. One of the chief problems dealt with is the reason for the prolonged action by esters of the type of oestradiol benzoate. The author concludes that the duration of action depends on the rate of absorption and produces evidence to show that oestrogenic substances after they have entered the circulation are inactivated fairly rapidly by the liver. The book is published in this country at 15s. by the Oxford University Press.

Income Tax Simplified, by Arthur Fieldhouse and E. Ewart Fieldhouse, sixteenth edition (Simpkin Marshall, 1s. 6d.), is intended to serve as a practical guide to the preparation of income tax returns, claims to repayment, etc., and to assist taxpayers not only to comply with the provisions of the income tax statutes but also to see that they receive the benefit of all the allowances and reliefs to which they may be entitled. Considerable trouble has been taken to supply helpful illustrations, and heavy type is freely—rather too freely—used to give emphasis to the points discussed. The general form lends itself perhaps rather to the use of examination students than to the convenience of taxpayers concerned with their own problems, but it is a clearly condensed statement of the essential features of the tax, and as such is good value for the price charged. The section dealing with

partnership profits is less clear in explanation than might be wished. The statement that "when the capital of partners, their salaries or their share of profits are unequal . . . the tax should be deducted from the interest on capital, salaries, and profits" will puzzle some readers. The facts, of course, are that there is no "deduction" of tax; the most convenient method is for the assessment to be divided between the partners as if it were a divisible profit and the tax on each portion calculated and in aggregate agreed with that shown in the firm's assessment; each partner can then pay his share, either separately to the collector or into the firm's account if the firm as such pays the total tax assessed. The publication has been brought up to date, and though the explanations are necessarily brief they cover the whole field, including the assessment of tax on property, firm profits, salaries, etc.

Preparations and Appliances

IMPROVED METHOD OF ADMINISTRATION OF VINESTHENE IN DENTAL SURGERY

Dr. K. B. Pinson, Mr. R. Bradbury, L.D.S., and Mr. E. B. Jones of Manchester write:

During the past two years, at the Stretford Council Dental Clinic, we have been using vinesthene in conjunction with nitrous oxide and oxygen administered nasally from a modified Clarke's apparatus. The vinesthene is injected into the rebreathing bag from a 10-c.cm. Record syringe, and is used to (1) deepen the anaesthesia, and (2) reinforce the action of N_2O and O_2 so as to render this form of anaesthesia suitable for very young children. To do this the vinesthene has to be given slowly, after induction with N_2O and O_2. The chief difficulty experienced is that salivation is increased, which sometimes makes the patient cough or is otherwise troublesome. Another objection sometimes raised is that 6 c.cm. of vinesthene may be required. Otherwise the method is a very satisfactory improvement on ethyl chloride, owing to relaxation of the jaw and absence of vomiting, factors which render vinesthene the safer anaesthetic.

We decided to use vinesthene alone for short anaesthesia in the manner that Goldman has described. The anaesthesia

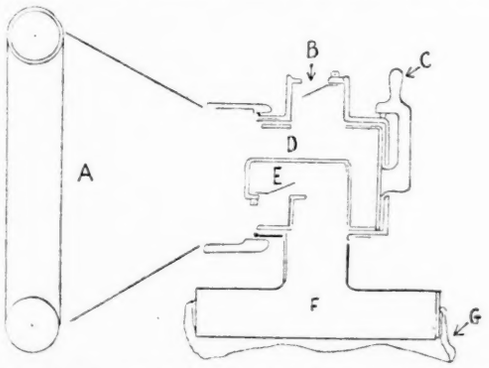

Fig. 1.—Diagram of altered cock. A, Face-piece. B, Valve for inhaling air. C, Cock lever. D, Cock. E, Valve for exhaling into bag. F, Bag-holder. G, Reversible bag.

was found to be good, but the manner of induction was unsatisfactory. It was difficult to get children of 3 to 4 years of age to co-operate by inflating the rebreathing bag, which was removed on inspiration and put back over the child's face for expiration, as recommended by Goldman. An ordinary type of N_2O three-way cock made with a wide neck and no inlet pipe was used, with a 1½-gallon rebreathing bag which was turned inside out after each case so as to permit of thorough cleansing.

It appeared to us that it would be advantageous if the mouth-piece could be left on the child's face during the complete respiratory cycle, so that the child could breathe in from the air and expire into the bag until it was filled. It would also help to gain the confidence of the child, since no anaesthetic would be given for the first half-minute or so. For this purpose we designed alterations to the existing valves, as shown in the accompanying diagram, from which it will be seen that (1) the expiratory valve is reversed, and (2) the inspiratory valve inside the cock is similarly altered by a built-up addition with a reversed valve flap so that on expiration the breath is directed into the bag, while inspiration is taken from the outside air.

METHOD OF INDUCTION

The face-piece is held gently on to the face. The lever on the cock is placed at the position marked "valves" until the bag is partly filled with expired air. It is then moved over to "to and fro" position, which allows inspiration from and expiration into the bag. Three c.cm. of vinesthene is then injected through a side tube in the bag-holder. The syringe is then removed to prevent breakage should the child try to knock the bag away. Neither N_2O nor oxygen are added. The apparatus is held on for sixty seconds, after which time complete dental anaesthesia is obtained, which lasts for about fifty seconds. We have found that the cock thus altered is a real improvement, and decidedly easier to use. Reversing the bag each time, too, gets rid of the smell of the anaesthetic, and little children are not upset by it.

In our experience this method has proved entirely satisfactory, and has enabled us to rely in most cases on the administration of vinesthene alone without the preliminary induction by nitrous oxide and oxygen.

The apparatus will be made by the Condensed Gas Co., Ltd., Rusholme, Manchester, 14.

THREE-WAY AUTOMATIC ADAPTOR FOR RECORD SYRINGE

Dr. I. David (Colombo) sends the following account of a three-way automatic glass adaptor manufactured for him by Adair Dutt and Co. of London.

Before the blood is drawn into the barrel of the syringe see that the valves move with each stroke of the piston. Air must be driven out if necessary by first filling the syringe with citrate solution or normal saline before the blood is drawn in. Even with a good syringe air will be sucked in unless the piston is worked slowly and steadily. Of course, every part must be airtight—namely, the piston, rubber tube

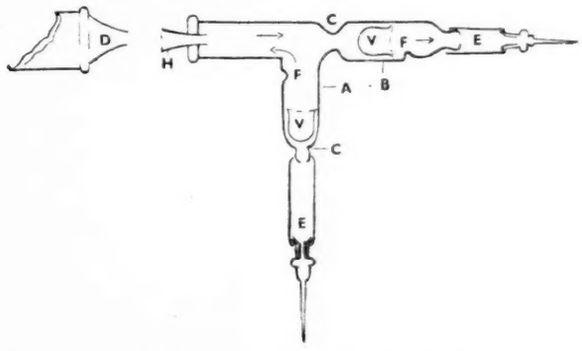

Fig. 1.—A, Aspirator or suction limb; B, injection or delivery limb; C, valve seat, which is closed by the valve V when in action; V, cup-shaped valve which acts in one direction only; D, nozzle of a Record syringe; E, rubber tubing; F, knob which prevents valves from closing delivery openings; H, removable metal mount to be taken apart when sterilizing.

connexions, nozzle, and the mount which receives it. It is better to hold the adaptor firmly against the nozzle of the syringe lest the former should drop down and break. I do not recommend a syringe of a larger capacity than one of 20 c.cm. I prefer a 5 c.cm. all-glass syringe, as I am of the opinion that in a smaller syringe there is not much chance of blood clotting or air entering. The adaptor is also useful for various other operations such as infusion, aspiration, and douching of cavities such as ear, nose, and vagina, and is also useful in administering glycerin and other enemata.

A BLOOD TRANSFUSION DEPOT AT WORK

The experience of air raid casualties in the Spanish civil war showed that at least 10 per cent. were of a serious character requiring blood transfusion. With this in mind, as the international situation worsened, it was considered imperative in this country to organize a scheme for the empanelling of volunteers and the withdrawal, storage, and rapid distribution of blood for the large number of transfusions which might be necessary should air attack develop on a large scale. Four depots were accordingly equipped for the supply of the hospitals in London and the surrounding areas. A recent visit to one of these was instructive, and illustrated once again what brilliant improvisation the war emergency has evoked.

The depot, which is housed in the country at a social centre, is under the direction of Dr. Janet Vaughan with a staff of four or five other medically qualified persons, most of whom have had a large amount of experience in haematological technique. The staff includes also five non-medical technicians, and there is always a trained nurse in attendance to look after the donors. The depot is now open from 8.30 in the morning until 10 at night, and one of the medical officers sleeps on the premises to be ready for any emergency call.

Method of Organization

The organization of this effort began with the enrolment and testing of volunteers, originally at the town hall, as long ago as last Easter. The volunteers are mostly workers in the factories which abound in this area. Addresses to factory workers were given by the medical director of the depot, and the response was all that could be desired, both men and women coming forward with quite extraordinary willingness. Immediately a state of war was declared a large number of universal donors—healthy persons—were called upon, and bloods were withdrawn and stored in an ice house ready for dispatch to any hospital on demand. Up to the time of writing the only calls have been for transfusion for ordinary sick or accident cases, but there the organization is in readiness, as at other points in the home counties, should air raid casualties occur.

The panel of donors now numbers some 15,000. The mere card-indexing of such a number would be regarded as a very serious business indeed for the average city office, but in this depot they seem to take it in their stride. The enrolment form states the name, address, and business and private telephone number of the donor, whether he is under any national service obligations which might interfere with his availability, what is the general state of his health (whether, for example, he suffers from malarial attacks), and particulars of any recent serious illness. Then there is added on to the card the blood group, and, what is of less importance, the character of the arm veins. Each card is afterwards stamped with a serial number, the date on which the blood was taken, the quantity, and the result of the Kahn test. The serial number is also indexed on a separate card and appears on the bottle labels. It is considered an advantage to keep blood of all groups, and the different groups are indicated by differently coloured cards, blue cards for the universal donors.

The Human Element

The cheerful atmosphere of the main hall, with the couches, each lightly screened, not preventing conversation between the occupants while waiting or resting, possibly accounts for the fact that, notwithstanding the large numbers that have been dealt with, so few mishaps of any kind have occurred. A few donors have exhibited a transient faintness, evidently a psychological condition, and quickly combated by restoratives at hand. It was mentioned that of those who do faint almost all are men! Hardly any accident has been experienced, none at all of any seriousness, and some of the donors have professed themselves feeling better for what has been done to them, and have even intimated a desire to come back before the stipulated minimum interval (a month) to undergo it again.

The trolleys beside each couch are of standard pattern. Good lighting is provided, and bleeding takes place under strictly aseptic conditions. A sphygmomanometer cuff is put on and a steady pressure of 80 mm. Hg maintained. An anaesthetic, 2 per cent. novutox, is used, which has the advantage of being self-sterilizing. A neat appliance is a standard towel of unbleached calico, with a button slit which can be placed over the antecubital fossa in such a way as to make only one towel necessary instead of the usual two. That again is an idea adapted from the Spanish civil war. Another happy notion is the shape of the bottles in which the blood is collected for storage. They resemble pint milk bottles, but they have been given a special waist so that they never slip from the hand in spite of constant use.

Storage and Distribution of Blood

After the blood has been withdrawn and carefully tested for sterility the labelled bottles are packed in sliding wicker crates similar to milk crates, each containing twelve bottles, and kept in a large ice house, the temperature of which is between 2° and 4° C. One appearance which at first caused some misgiving was a scum which formed to a varying extent on the top of the stored blood, but the most rigid examination has proved that it is not due to any contamination; it seems to be partly fat and partly protein. Each bottle contains about 500 c.cm. of blood. The depot includes well-equipped sterilizing rooms with stills for distilled water and three large autoclaves which look somewhat primitive, but function excellently. In the little laboratory regroupings and Kahn tests are carried out—it was stated that there have not been many positive tests, fewer indeed than 1 per cent.—and advantage has been taken of the quiet time to do a certain amount of research. The fragility of the red cells in the stored blood has been investigated, and a complete haematological study of the blood from the day it is taken until the thirtieth day, when it is destroyed, has been made.

The bottles which are sent out on demand carry a label which it is requested shall be filled in by those superintending the transfusion and returned with the empty bottle. This label gives the date on which the blood was taken, and the completed particulars will furnish the date on which it was used, the reason it was needed, the name of the patient, any information as to clots or haemolysis, and the result of the transfusion. The label reads as follows:

O Group IV
Citrated Blood for Transfusion

Mix without undue shaking and stand the bottle in warm water (not more than 40° C) for 15–20 minutes before use. Rotate occasionally. Use before (insert date).

The blood is sent to the hospitals in vans equipped with refrigeration plant, and as an example of how details have been thought out it may be mentioned that every hospital likely to be served has been routed, and the typewritten direction sheet is handed to the driver of the van. This is not the place to discuss the scientific results of the use of stored blood, but the war experience is resulting in a great deal of useful information which will be forthcoming at the proper opportunity.

Erythrogenic Toxin.—A method is described for preparing the erythrogenic toxin of *Streptococcus pyogenes* in very high concentration and a state "approaching" purity. It depends on the use of a broth which has diffused through cellophane, and the subsequent elimination from the culture of all the original constituents of the medium by the same process.—Studies on Haemolytic Streptococcus: I. Isolation and Concentration of Erythrogenic Toxin of NY 5 Strain of Haemolytic Streptococcus. II. Experimental Use of Purified Erythrogenic Toxins in Immunization against Scarlet Fever. M. L. Menten, H. H. Finlay, and A. H. Stock.—*J. Immunol.* June, 1939, **36**, 489.

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A HISTORY OF TROPICAL MEDICINE

By writing his two volumes on the history of tropical medicine[1] Dr. Harold Scott has put many people in his debt; other medical historians, students interested in special diseases or in the health reforms effected, or in the strenuous lives he has chronicled, will consult his work. Their object in doing so may be to amend perhaps, more probably to amplify, most probably to borrow, but they will consult it. Of the Navy and Mercantile Marine, and the care and treatment given to the personnel, Dr. Scott writes:

"The old-time naval surgeon excused himself for doing nothing, or perhaps we should say, justified his expectant treatment, by the conviction that 'two-thirds had such bad constitutions that no physician could save them, and the rest such good ones that all the physicians in the world could not kill them.' Sickness, moreover, was not encouraged. A man taken ill on board, if he did not speedily recover, was put on shore and treated for a month. If he was incurable or was permanently disabled, and was not one of the fortunate few to obtain admission to Greenwich Hospital, he was callously turned adrift to shift as best he could for himself."

The spread of knowledge with regard to the prevention of scurvy seems to have been an elaborately slow process among the higher authorities responsible for the health of sailors. In 1740–4 Lord Anson made a voyage round the world—"one of the most disastrous voyages in history." A note of the scurvy on two of the ships is given:

"The havock which this dreadful calamity made in those ships was truly surprising. The *Centurion* from her leaving England, when at this island (Juan Fernandez) had buried 292 men and had but 214 remaining of her complement. The *Gloucester*, out of a smaller complement, buried the same number and had only eighty-two alive."

Yet we read that from the year 1600 onwards the East India Company had been quite cognizant of the prevention of scurvy by the use of oranges and lemons, and that these had been carried on board as part of the regular supply. Time brings its changes. In 1827 Goethe could write to Eckermann:

"It is absolutely indispensable for the United States to effect a way through from the Gulf of Mexico to the Pacific Ocean, and I am certain they will compass it. This I should like to live to see, but I shall not . . . lastly, I should like to see the English in possession of a Suez Canal."

Goethe could no more forsee the difficulties of the Panama enterprise than could Lesseps himself. Neither of them suspected the dangers hidden in those pestilential swamps. None knew how many workers were destined to spend an all too brief existence there, scratching their innumerable insect bites, only to die miserably in the end from malaria and blackwater fever or yellow fever conveyed through these very bites. No wonder that the first undertaking, conceived in such complete medical ignorance, born and nurtured in an atmosphere more than a little tainted by commercial fraud, came to an end in bankruptcy. We are little surprised, the story of the failure having been told, when we read concerning Lesseps, the triumphant creator of the Suez Canal, that he became almost insane as a result of the fiasco of Panama.

The lower animals, invertebrate and vertebrate, play a remarkably large part in the dissemination of tropical diseases. Man is emerging more and more in the light of a casualty from accidental infection. He has often intruded into a cycle of animal disease which was going on before he arrived on the scene, and which will doubtless go on after he has disappeared from it. The skin of the tarabagan, *Arctomys bobac*, may have some value, but hardly enough to make it worth while running great risks on its account. Yet Scott relates that the Manchurian epidemic of pneumonic plague in 1910, which caused the death of 42,000 people, was due largely to the excessive zeal, coupled with the inexperience, of newcomers to the growing industry of hunting and skinning these animals. The old hands knew that sickly and dead animals should be left alone or dangerous illness would follow. Yellow fever, until only a few years ago, was accepted as a man—*Aëdes-aegypti*—man disease confined to the littoral of endemic regions. It is now found to be a widespread endemic of inland rural areas where *Aëdes aegypti* cannot be found—conditions the very reverse of the classical optimum, "a dense population, in a seaboard town, with abundant *Aëdes*." Further, there is evidence that monkeys and possibly other animals may contract and recover from yellow fever. Malarial parasites morphologically indistinguishable from those which infect man have been found in chimpanzees, and desultory experiments are going on to discover whether or not they can infect man. It is held by some workers that the louse-borne virus of epidemic human typhus originates in an endemic typhus carried from the rat by its fleas. Rats are the reservoir of infectious jaundice and several human diseases. We have come to look upon American trypanosomiasis as normally a disease of various animals and tularaemia as a disease of rodents. Rats and their kind have indeed much to answer for to the human race.

It is of interest to try to follow the processes by which any great discoveries come to be made. Does the investigator, in the midst of his daily routine work

[1] *A History of Tropical Medicine. Based on the Fitzpatrick Lectures, 1937–8.* By H. Harold Scott, C.M.G., M.D., F.R.C.P. Volumes I and II. London: Edward Arnold. (50s.)

or during his scant leisure time, find himself suddenly struck dumb at the moment of some divine inspiration? Here Dr. Scott helps us greatly in so far as the notable discoveries of tropical medicine are concerned. The divine inspiration theory will not bear long inspection, and certainly dumbness has never proved a prominent characteristic of discoverers. Sad though it may appear to the worshipper of heroes, it is nevertheless true that every discovery described in these volumes was preceded by a long prodromal period. During this time vague hypothesis had given place to a well-defined theory and even, in some cases, to well-planned experimental work which was within an ace of attaining success. There are many instances. Let the reader peruse, under the guidance of Dr. Scott, the history of yellow fever, and he will not be surprised that the names of Nott, Beauperthuy, and Finlay find honourable mention along with those of Reed, Carroll, Lazear, and Agramonte, and with those of Noguchi, Stokes, and Young of later years. Juan Carlos Finlay of Cuba enunciated his mosquito theory of the transmission of yellow fever at the International Sanitary Conference in Washington in 1881. He had already carried out experiments in which he had fed *Aëdes* on infected persons and then, at too short an interval as it turned out, on non-immunes. Or let him consider African trypanosomiasis. It was in 1895 in Zululand that Bruce discovered that the disease "nagana" of domestic stock was a trypanosomiasis transmitted by the tsetse fly. Now Livingstone, as far back as 1857, had frequently mentioned the fly, and specimens of *Glossina morsitans* had been brought to England and figured. Of the tsetse fly Livingstone wrote: "It is well known that the bite of this poisonous insect is certain death to the ox, horse, and dog." Trypanosomes in the blood of rats had long been known through the work of Lewis, and Griffith Evans as early as 1880 found them in the blood of horses and camels affected with "surra." Delafield, writing on malarial fevers in 1872, is quoted by Scott: "We find that the most constant lesion is the presence of little particles of black or reddish pigment in the blood. The pigment is in the form of flakes or of granules embedded in small, irregular, transparent, finely granular bodies. We also find the same transparent bodies without pigment." It remained for Laveran in 1880 to prove that the "transparent, finely granular bodies" were the cause, as well as "the most constant lesion," of malaria. Forde observed, then Dutton recognized and described, in a case of sleeping sickness the trypanosome called by him *T. gambiense*; but they did not associate the parasite with the disease. Bruce, Castellani, and others studied sleeping sickness but did not at first associate it with the trypanosome *T. gambiense*, which they also found.

It is because many people have usually had a hand in the making of a "discovery" that it is so difficult to allocate the just praise for it with any precision; this difficulty is well brought out in Scott's account of his historical research. Claims to discovery are apt to be not unlike the claims to have been instrumental in winning the battle of Waterloo. There are probably numbers of Bill Adams in all branches of scientific work; certainly tropical medicine has had its share. The discoverer is the man who puts two and two together; it is only by reading the history of most discoveries that we learn of the previous existence of the two and two. This explains many of the controversies between the supporters of Manson, Ross, Grassi, Bignami, and others concerning the discovery of the transmission of malaria and the mosquito theory. It explains the fact that ". . . France ascribed it to Laveran in 1891, Germany to Koch and Pfeiffer in 1892, England to Manson in 1894, Italy to Bignami and Mendini in 1896, and, not to be outdone, or thinking perhaps that numbers would make up for loss of priority, to Grassi in 1898." It accounts also for the many similar controversies on yellow fever, trypanosomiasis, and other diseases.

Lest any prospective reader should fail to obtain this book on the excuse that the particular disease in which he is interested may not find a place in it, the following are the contents: malaria, blackwater fever, yellow fever, human trypanosomiasis (African and American), leishmaniasis (kala-azar and cutaneous leishmaniasis), leprosy, cholera, plague, undulant fever, relapsing fever, melioidosis, dengue, amoebic dysentery and hepatitis, ankylostomiasis, beriberi, epidemic dropsy, pellagra, scurvy, poisonous foods—for example, from akee (*Blighia sapida*)—and ginger paralysis resulting from adulteration of ginger with triorthocresyl phosphate. Probably it is demanding too much, when a writer has expended so many laborious hours in research on his subject, that any reader should ask for still further efforts on his part. But there remain several diseases of the Tropics besides those dealt with in these two volumes which merit consideration on similar lines. Could Dr. Scott be persuaded to take a very deep breath and plunge into it once more?

"THE FOURTH ARM"

That finance is "the prop that sustains the whole of our war effort" is a truism that this country has successfully acted on in the past, and will have to bear very clearly in mind during the coming days of trial and strain. In this field of activity as in others the dearly bought lessons of twenty-five years ago are being restudied so that mistakes may be avoided and the country's maximum effort brought to bear on the issues of war at the earliest opportunity. This acceleration is noticeable in the promptitude with which steps are to be taken by the Revenue authori-

ties to initiate an Excess Profits Tax, so that those whose businesses are so circumstanced that they become more profitable in time of war shall make special contributions to the Exchequer. The equity of such a demand will in general be conceded readily enough; the difficulty is that in so many cases the absence of a reasonably good standard of profits in recent years is apt to cause individual hardship. Various modifications are, however, provided which will apparently ensure at least "rough justice" in such cases. What is perhaps more important to the general public is that the tax should not operate as its forerunner, the Excess Profits Duty of the last war, too often did to make employers careless and uneconomical in the conduct of their businesses, with the result that waste and rising costs affected adversely the general level of prices and reduced the purchasing ability of the public. In that, as in other aspects of finance and industry, the ultimate safeguards lie in the good sense and patriotism of the nation, and an early realization of that fact should avoid disappointments in the future. In the meantime no reliable estimate can be made as to the probable yield of this tax; but excess profits are apparently the inevitable accompaniment of war conditions, and if they cannot be avoided at least they can be specially taxed.

So far as the income tax payer is concerned, Sir John Simon's demands for the current financial year have exceeded general expectation. The corresponding War Budget of 1914 raised the standard rate of tax from 1s. 3d. to 1s. 8d. The contrast between those figures and the present increase from 5s. 6d. to 7s. is an eloquent commentary on the difference in our general fiscal condition and on the sacrifice which taxpayers are to be called upon to undergo. The special provision for the relief of those taxpayers whose earnings have fallen as a result of the war will in some cases be very welcome, but the prospect of having to meet the increased demand in three or four months' time is a very serious matter for all of us. The indirect taxpayer is also required to contribute by increased taxes on beer, wines and spirits, on tobacco and on sugar—the last, the only increase in an involuntary indirect tax, is made avowedly so that no citizen, however humble, should escape some special contribution to the national needs. Of less immediate interest but of perhaps even greater ultimate importance is the Chancellor's foreshadowing of Government policy with regard to loan finance. The Empire's premier security—the loan issues of the British Government—set the level of the yield of trustee stocks, and thereby have a powerful influence on interest rates generally. Consequently a rise in the rate of Government interest not only affects the Exchequer directly but by its secondary results increases the cost of financing the running of a business, the acquisition of a practice, etc., and imposes a check on enterprise which is prejudical to the national well-being. It is to be hoped that when the Government applies to the people for subscriptions to a War Loan the rate of interest can be kept at a moderate level, and no doubt it was with that in view that the Chancellor referred to the further duties which citizens would be called upon to fulfil if the evils of inflation were to be avoided.

It is obvious that the nation must contemplate expenditure on a scale without precedent even in the last war, and it is almost equally obvious that the necessity and the accompanying obligation to meet it so far as possible by taxation of current income will be accepted, but only on one condition—namely, that waste shall be avoided or at least quickly detected and firmly and immediately eliminated. In that connexion Sir John Simon's appointment of "Treasury watch-dogs" to the spending Departments is a step in the right direction and should lead to good results. Some waste of money and effort is inseparable from so sudden and so immense an expansion of Government activity; but it must be kept to the irreducible minimum. If taxpayers feel that they are reasonably safeguarded in that respect they can be relied on to play their part to the end.

OPERATIVE ASEPSIS

We have referred on previous occasions to papers by Hart of Durham, U.S.A., on the prevention of infection in operation wounds. His belief is that operation sites, especially when extensive and long exposed, as in thoracoplasty, are liable to be contaminated by bacteria in the air, especially staphylococci. The method he proposes for preventing this is to expose the site and its surroundings to bactericidal light from a special mercury-vapour lamp, and the adoption of this precaution has actually led in his hands to a marked decline in the frequency of wound infections. In two further papers[1] he now describes experiments illustrating the bactericidal capacity of light from this lamp, and furnishes evidence, obtained by studying the healing of experimental wounds in rats after exposure to the lamp, that the reparative powers of various tissues remain unimpaired. This might appear to be the end of the story, and conscientious surgeons might feel obliged to install what is doubtless an expensive piece of apparatus in order to safeguard their patients against the risk of accidental infection. Nevertheless there is a flaw in the argument; as we have pointed out before, Hart's exhaustive studies do not explain how pathogenic staphylococci get into the air of his theatre in spite of all his earlier precautions. These included not only the frequent washing of the room, the provision of filtered air, the wearing of "large heavy" masks by all occupants (whether an operation was in progress or not), the exclusion of staphylococcus throat carriers, but even the imposition of silence on

[1] *Arch. Surg.*, Chicago, 1939, **38**, 797, 806.

all occupants. Any one of the last three of these measures, faithfully carried out, might be expected to prevent contamination of the air from the throats of the theatre staff; yet according to Hart this was the source of infections which continued in spite of adopting all of them. He considers and rejects the possibility that their source is the patient's own skin, but an alternative not discussed in his papers is their origination from the skin of the surgeon. This is nevertheless the explanation arrived at by Devenish and Miles[2] after investigating the circumstances of a series of infections in clean operation wounds at University College Hospital. The wholesale exposure of agar plates in the theatre led in the first place to the conclusion that the average rate of fall of particles containing *Staphylococcus aureus* on an exposed surface with an area of 12 square inches was about 0.3 per hour, obviously an almost negligible risk. Comparison with Hart's original data on this point[3] is difficult because his results are very variable (from *nil* to fifty-one colonies per plate per hour), and since the majority of the staphylococci recovered were "non-haemolytic" and other tests more indicative of pathogenicity were not applied to them it is doubtful how many of them were in fact pathogenic. The task of Devenish and Miles was made easier by the fact that most of their unexplained sepsis followed operations by a particular surgeon. He was found to be a skin carrier of *Staphylococcus aureus*, and large numbers of these cocci were found in the sweat inside his gloves; they are presumed to have reached operation wounds through small perforations in the glove, and perhaps the most disturbing feature of this inquiry is the observation, based on the examination of some thousands of gloves, that the frequency of glove puncture during operation is 24 per cent., and remains as high as 14 per cent. in spite of precautions to avoid it, That this is the true explanation of this particular series of wound infections there can be no doubt, and it is so much more credible than Hart's hypothesis that one is tempted to grant it a more general application. If Hart is wrong about the source of infection in his cases but right about the beneficial action of his lamp, does this lamp actually kill staphylococci in the wound itself? This is a matter which it should be fairly easy to investigate, but in any event the next word lies with him.

ABORTION FROM CANCER SERUM AND URINE

Interesting observations on a selective action of urine and serum from cancerous patients on embryonic and newly growing tissues have recently been reported by Elsasser and Wallace[4] of New York. Their first observation was that the urine of a man suffering from an embryonic carcinoma of the testis gave a positive Aschheim-Zondek reaction, and daily intravenous injections of the urine into a twelve-day-pregnant rabbit produced abortion on the fifth day. Urine from other patients with tumours of embryonic type and from "a large number" of patients with other kinds of malignant tumours always caused abortion, usually within five days. Blood serum had the same effect. Urine or serum from "a considerable number" of normal individuals and hospital patients without tumours did not bring about abortion, nor did the urine of pregnant women. Cancer serum and urine caused a progressive necrosis, associated with filtration of inflammatory cells, in the placenta; in non-pregnant female rabbits the Graafian follicles degenerated or were destroyed, and the ovaries became small and sclerotic; in male rabbits the testis degenerated or spermatogenesis was suppressed. Cancer urine also gave rise to necrosis of a transplantable rat carcinoma; the necrosis started at the periphery and involved newly formed blood vessels as well as cancer cells. The substance responsible for these effects has not been identified. The authors did not advocate the use of these reactions as a diagnostic test for cancer, but the May issue of the *National Bulletin of the American Society for the Control of Cancer* states that the paper has been given widespread publicity, including mention on the front page of the *New York Times*, and that the society had therefore issued a cautionary notice. This refers to the bad reputation of serum tests for cancer, and states that the abortion test seems to have been employed only on cases where cancer was known to be present and had been diagnosed by other methods. Thorough investigation must precede the recognition of diagnostic value. Apart from their possible use in diagnosis, the reactions, if substantiated, will be important in the study of malignant processes. Independent confirmation and extension of the observations will be awaited with interest.

DISSOCIATION OF TUBERCLE BACILLI

Though by suitable cultural and animal inoculation methods mammalian tubercle bacilli can usually be divided into human and bovine types, occasional exceptions are encountered, the classification of which presents certain difficulties. Dr. Frimodt-Möller[1] has made a special study of these aberrant strains with particular reference to variations they may undergo in the laboratory, and has succeeded in showing that true, as opposed to mere environmental, dissociation may occur with the production of stable variants differing in cultural properties and sometimes in virulence from the original strain. The strains with which he worked were derived from human tuberculous material by cultivation on Jensen's modification of Löwenstein's medium containing 0.75 per cent. glycerin. It is believed that this strength of glycerin is insufficient to inhibit the growth of bovine but sufficient to stimulate that of human type bacilli. Twelve primary dysgonic human strains gave off in culture stable eugonic variants, while 39 other strains of human type, which were less eugonic than usual on primary isolation, failed to do so. Thirteen typical dysgonic bovine strains were examined. Of these, five formed eugonic variants of full virulence, and six formed eugonic

[1] *Dissociation of Tubercle Bacilli: Investigations on the Mammalian Types (including B.C.G.)* By J. Frimodt-Möller. Copenhagen: Arnold Busck; London: H. K. Lewis. (10s.)

[2] *Lancet*, 1939, **1**, 1088.
[3] *Arch. Surg.*, Chicago, 1938, **37**, 521.
[4] *Science*, 1939, **89**, 250.

variants of attenuated virulence, which, however, reverted to full virulence on a single animal passage. The remaining two strains were of special interest in forming eugonic variants which were completely and persistently avirulent, resembling in this respect the B.C.G. strain. Dissociation appeared to be favoured by acid in the medium, but to be more or less independent of glycerin. With one exception it invariably occurred in the direction of dysgonic to eugonic, or, as the author calls it, S to R. It is well known that in certain types of tuberculosis, such as lupus, variant strains may arise, some of which retain their characteristics in culture. It is also clear that variations may occur primarily in the laboratory. So far, however, no strain has yet been found to change in type from typical human to typical bovine or vice versa. Dr. Frimodt-Möller's monograph contains observations of much interest, which are presented in a clear and easily assimilable form. The initial historical introduction will be of special value to those who have been unable to follow the often complex results described by previous workers.

MEDICAL RESEARCH IN CANADA

The National Research Council of Canada has now issued its twenty-first annual report, a copy of which will be available in the Reference Library, Canada House, Trafalgar Square, London, S.W.1. Special mention is made of the formation of the Associate Committee on Medical Research under the chairmanship of Sir Frederick Banting, co-discoverer of insulin. The method of forming this committee may be considered as typical. Preliminary discussions by representatives of the Canadian Medical Association, the Royal College of Physicians and Surgeons, the Department of Pensions and National Health, and the National Health Research Council resulted in the calling of a conference for the consideration of all matters relating to medical research in Canada. At this conference a composite picture of medical research was obtained when each institution represented at the meeting reported on the scope of the researches on which it was engaged. On the recommendation of the conference the Associate Committee on Medical Research was formed. Since then the correlation of medical research in Canada has been fostered through interchange of visits by research workers and group planning of investigations in many fields. A distinct contribution to the furtherance of organized research in the medical field has thus been made. Similar committees function under the Council in many fields: aeronautics, asbestos, coal classification and analysis, field crop diseases, fire hazard testing, forestry, gas research, laundry research, leather, magnesian products, market poultry, metallic magnesium, parasitology, plant hormones, potato research, radio, radiology, survey research, weeds, and wool. Radium preparations in large numbers are measured and certified in the radium laboratory. Recently a device for rapid testing of radium tubes for leakage was constructed and a method for measuring the radium content of barium-radium bromide preparations was developed.

MALARIA IN MALAYA

The annual report for 1938 of the Malaria Advisory Board, Federated Malay States, records a noteworthy increase in the number of malarial cases admitted to hospital. The total figure, 51,300, compares with 35,500 in 1937 and 27,200 in 1936. These figures are stated to fall far short of the total incidence. Meteorological conditions during the year were unusual, the rainfall having been unduly low. The rise in incidence is, however, chiefly attributed to widespread replanting of rubber. The process involves the formation of large holes from which old trees have been removed and the digging of many other holes, often left open for some months to "weather" the soil, for the reception of planting material from the nurseries. Modern planting practice also requires terracing or the construction of silt pits on hilly land for the purpose of minimizing soil erosion. Collections of water and newly opened seepages thus formed provide many additional breeding places for anophelines, and, unless every precaution is taken, intensive breeding is likely to result. Although it has been found that anti-larval measures concentrated within a half-mile radius of habitations usually give reasonable protection, the investigations of Dr. W. E. Holmes, health officer, Kuala Lumpur, showed that *A. maculatus* could be taken at distances up to two miles from a replanted area, where breeding was intense. The mortality for hospital cases of malaria shows a satisfactory decrease, the percentage having fallen from 2.2 to 1.8. Diminished virulence of the parasites and/or increasing immunity of the population are suggested as possible contributory factors. To test the therapeutic value of prontosil in malaria twenty-seven subtertian and thirty-seven benign tertian cases were treated with this drug. The dosage was 1.5 grammes twice daily for seven days. It was found to be less efficient, both in antipyretic action and in its effect on the parasites, than quinine, while it cost more than three times as much. *P. falciparum* proved to be more susceptible to prontosil than *P. vivax*. With regard to the anti-larval oils experiments were carried out to test the effect of the addition of pyrethrum to the oiling mixtures. With the more active oils the only result was that the larvae died more quickly. The number that died was not increased. But with an oil of high boiling range it was found that the addition of pyrethrum increased not only the larval death rate but also the power to penetrate the tracheae of the larvae.

We announce with much regret the death of Dr. J. D. Comrie, physician to the Edinburgh Royal Infirmary, chairman of the Scottish Committee of the British Medical Association, and for many years a member of the Central Council and of the Journal Committee. Dr. Comrie was also chairman of the Central Medical War Committee for Scotland.

Professor J. H. Burn, M.D., has been nominated by the King on the advice of the Privy Council to be a member of the General Medical Council for five years in succession to Sir George Newman.

WAR WOUNDS AND AIR RAID CASUALTIES

The following article is a supplement to the series of lectures on war wounds and air raid casualties printed in these columns*

CHEMICAL WARFARE AND THE DOCTOR—I

BY

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From the earliest times in the history of the world certain sociological, physical, and biological factors have governed the problem of the growth of population. Disease, as seen in individual cases, in epidemics, or in pandemics sweeping Europe in the Middle Ages, has from time to time decimated the population. War, with its horrors and vast numbers of men killed by disease and wounds, may be included in this list, together with famine, pestilence, floods, and earthquakes.

The present war, however, will be different and probably more horrible. While in former days war was an affair where men fought men, and women and children suffered accidentally or indirectly, to-day the idea is accepted by some Governments that it is justifiable for one nation to attempt to impose its will on another by striking a sudden swift crushing blow on vital vulnerable points in the country of its enemies. That is to say, civil centres are to be attacked in addition to, or apart from, definite targets of naval or military importance. For this reason many conferences have been held under the auspices of the International Red Cross of Geneva since the year 1920. The problem of protecting the civil population has now been accepted by every Government in Europe, including that of Great Britain, whose A.R.P. organization is so well known to all.

The subject of the medical aspects of chemical warfare is of grave practical importance to all medical men. It is not enough to be told how to treat the results of exposure to certain gases. As in typhoid, for instance, a study of the aetiology, pathology, and clinical picture is essential. In the present paper a list of substances most likely to be met with in chemical warfare is given, together with an account of their physical and chemical properties and a description of their physiological action. Their pathological effects will be discussed in the next paper.

History of Chemical Warfare

A full account of the history of chemical warfare may be found in a book published in 1935 by two French naval surgeons, Héderer and Istin. "Gas" is one of the most ancient devices used in fighting. Details are described by Thucydides of the method employed in the Peloponnesian War in the fifth century B.C. After months of siege, faggots impregnated with pitch and sulphur were set on fire outside the city walls. The wind drove on the cloud and rendered one point of the defence untenable. However, a thunderstorm broke, the rain extinguished the fire, and the first gas attack on record was unsuccessful. In the same campaign an efficient "flame projector" was designed and used. In 1726 Fleming described in his book *The Perfect German Soldier* several new poisons to be incorporated in grenades.

* Received for publication on August 4.

Chemical warfare fell into disuse for the next hundred years, and the British Government refused to sanction the use of toxic shells and grenades in the Crimea. In spite of the agreement of The Hague, 1899, chemical warfare was reintroduced in the Great War and enormously developed. Although occasional use of toxic shells by the Germans was reported from October, 1914, onwards, it was not until April 22, 1915, that chemical warfare was indulged in on a large scale. The Germans launched clouds of chlorine on a six-kilometre front in a surprise attack, causing 15,000 casualties, 5,000 of them fatal. In addition large numbers of prisoners and quantities of war material were lost to the enemy. The success of this attack depended on the element of surprise. No means were at hand to protect the troops. Major-General C. H. Foulkes, the officer in charge of the Special Brigade in France in the great war, writing in his book *Gas* in 1936, states that many warnings were received of this gas attack. These were not appreciated, however, until 1932. After the April, 1915, attack the matter was at once taken up by our Army Medical Service.

The first mask was immediately devised at the Royal Army Medical College, Millbank. This consisted of a pad of wool impregnated with sodium hyposulphite and tied over the mouth and nose by a length of veiling material. Large numbers of women workers were collected, and in three days the troops at the front were provided with 100,000 masks. In September of the same year chlorine was used by our troops at the beginning of the Battle of Loos. The attack was not very successful, and I remember seeing our own men admitted to a casualty clearing station later in the day with pink eyes and green buttons. Intensive work was carried out in the perfection of the anti-gas respirator, until finally an article was produced which was proof against all gases except carbon monoxide, and which permitted free action in fighting. In 1917 the Germans first used "mustard gas"—another surprise.

It is interesting to note that with the provision of respirators, introduction of gas discipline, and dissemination of a knowledge of chemical warfare, the casualties progressively diminished although the number of our troops in the field was enormously increased.

Agents used in Chemical Warfare

The most useful and generally accepted classification of war "gases" is the physiological one, determined by the action of these chemical substances in various parts of the body. The main groups are, in the order of their toxicity: (I) lacrimators (tear gas); (II) sternutators (nose irritants); (III) vesicants (blistering); (IV) lung irritants; (V) paralysants; (VI) gases met with accidentally, as carbon monoxide.

The following list is compiled from Vedder (1925, U.S.A.), with up-to-date additions.

I. *Lacrimators.*—Acrolein; benzyl bromide; bromacetone; bromobenzyl cyanide (B.B.C.); chloro-acetophenone (C.A.P.); dibrom-methyl-ethyl-ketone; ethyl-iodoacetate (K.S.K.); methyl-chlorsulphonate; monobrom-methyl-ethyl-ketone; xylylene bromide.

II. *Sternutators.*—Diphenylchlorarsine (D.A.)—Clark I; diphenylcyanarsine (D.C.)—Clark II; diphenylarsine-chlorarsine (D.M.)—Adamsite (or chloro-dihydro-phenarsazine); ethyl-dichlorarsine; *N*-ethyl-carbazol.

III. *Vesicants.* — Lewisite — chlorovinyl-dichlorarsine; mustard — dichlordiethyl sulphide (thiodiglycol chloride).

IV. *Lung Irritants.*—Chlorine; chloromethyl-chloroformate (palite); chloropicrine; cyanogen bromide; dichlormethyl ether; phenyl-carbylamine chloride; phosgene; stannic chloride; trichloromethyl-chloroformate (diphosgene or superpalite).

V. *Paralysants.* — Hydrocyanic acid; sulphuretted hydrogen.

VI. Gases met with accidentally—see Group III below.

In the *Medical Manual of Chemical Warfare* (H.M. Stationery Office, 1939) the following classification is suggested, with a view to combining both tactical object and physiological effect.

Group I.—Lethal: (*a*) vesicants; (*b*) lung irritants; (*c*) paralysants.

Group II.—Harassing: (*a*) lacrimators; (*b*) sensory irritants.

Group III.—Accidental (gases not used as weapons, as carbon monoxide).

The physical and chemical properties of the chemical agents most likely to be met with are briefly described below. The volatility of these substances is important. Gases may be persistent or non-persistent (P. or N.P.).

Lacrimators

Bromobenzyl cyanide (B.B.C.) (discovered in 1881), as commercially prepared, is a heavy, oily, dark brown liquid, very persistent, so that contaminated earth causes lacrimation after thirty days' exposure. B.B.C. corrodes metals except lead; it is expensive, and not likely to be used.

Chloro-acetophenone (C.A.P.) (1887) consists of white crystals melting at about 60° C. and with a high boiling-point and a low vapour pressure. It is very slightly soluble in water, but soluble in ether, alcohol, or benzene, and a hot aqueous solution of sodium carbonate. It smells of cheap scented soap. It is cheap, and easy to manufacture and store in shells or bombs, so that it is the substance most likely to be met with. It is non-persistent. It may irritate and redden the skin.

Ethyl-iodoacetate (K.S.K.) is a dark brown liquid, invisible in the gaseous state. It is persistent, and has a pear-drop smell.

Sternutators (All Non-persistent)

These substances form the "irritant smokes" and contain arsenic.

Diphenylchlorarsine (D.A.) (Clark I) (1878) is a thick semi-solid compound, slightly soluble in water but soluble in chloropicrin and phosgene. As a vapour it is a strong irritant, and when diluted is aromatic.

Diphenylarsine-chlorarsine (Adamsite) (1918) is similar, but is not soluble in phosgene. It tarnishes metals (D.A. does not), is easier to manufacture, and the toxic effects last longer.

These arsenic compounds are employed as mists or clouds. Both Groups I and II are easy to detect.

Vesicants

Lewisite (chlorovinyl-dichlorarsine), first made in America in 1918 and not hitherto used in warfare, is a heavy oily liquid darkening on standing. It is easier to detect than mustard, which in low concentrations may produce its effects before its presence is realized. The slight odour of lewisite resembles geraniums. It is soluble in oils, benzene, and the ordinary organic solvents. It is insoluble in water, but hydrolyses rapidly. This action is increased by heat and alkalis. The blistering concentration is given as 0.334 mg. per litre, which theoretically makes it an effective war gas. However, as it is so rapidly destroyed by water or aqueous vapour, and has not yet been put to a practical test, it is unlikely to be used in war. Lewisite is persistent, but less so than mustard.

Mustard (dichlordiethyl sulphide) was first used by the Germans in 1917, and manufacture of this substance by us was not completed until almost the end of the war. As in the case of chlorine, our Intelligence Service secured early information, the full meaning of which was, however, only understood at a later date. Mustard is a heavy oily liquid, in the pure state colourless and almost odourless. In quantities as produced commercially it is dark in colour and smells of mustard or garlic. It is highly persistent, and stable at ordinary temperatures. Heat causes decomposition into HCl and highly toxic lacrimators. Contact with water causes slow hydrolysis, which is hastened by heat. The resulting products are harmless—dilute HCl and thiodiglycol. Since its specific gravity is 1280 at 15° C., it readily sinks when added to water. Weathering will thus ultimately destroy mustard. Hypochlorites react violently with mustard, producing a non-toxic sulphoxide. This explains the use of "bleach" calcium hypochlorite.

Mustard is soluble in water to less than 1 per cent., but is freely soluble in the hydrocarbon oils, such as paraffin or petrol, and substances such as animal fats, ether, benzene, alcohol, acetone, carbon disulphide, etc. It is also readily dissolved in rubber, and permeates clothing, leather, wood, bricks, etc., like ink on blotting-paper. This property of penetration into most materials other than metals and substances with a glazed surface renders its destruction especially difficult. Mustard has a low vapour pressure, which explains why it vaporizes so slowly and is so persistent, and also the varying effects according to the temperature and humidity of the atmosphere.

This is the gas most to be expected in war. Of 36,965 gas casualties in the American Army, 27,711 were due to mustard (Vedder), and of the 160,970 gas casualties admitted to the casualty clearing stations of the B.E.F. 77.7 per cent. were due to the same cause. Exposure to a concentration of 1 in 1,000,000 is effective.

Lung Irritants

Chlorine is a greenish gas, 2.5 times as heavy as air; it therefore clings to the ground and fills hollows. It is easily liquefied; one litre of liquid chlorine at 25° C. will produce 434 litres of gas. Its pungent smell is well known. It is non-persistent. Pure dry chlorine will not corrode steel.

Phosgene ($COCl_2$; C.G.; carbonyl chloride or carbon oxychloride) is the most effective and lethal of the pulmonary irritants, but fortunately is completely resisted by the respirator. It is a liquid, boiling at 8.2° C. (46.8° F.). It is colourless, smells of "musty hay," and is 3.5 times as dense as air. It is non-persistent, and is easily moved on by the wind. Phosgene is readily hydrolysed, so that it cannot be employed in damp or rainy weather. The hydrochloric acid liberated in the presence of moisture

corrodes steel, damages clothing, and destroys the tissues of the lungs. Soda-lime is used in the canister of the respirator to absorb phosgene. Phosgene will dissolve several of the toxic gases, and mixtures of mustard, chloropicrin, and the arsenic smokes may be expected. This gas is liquefied easily, as in the case of chlorine. *Diphosgene* (perstoff, superpalite, or trichloromethylchloroformate) is an oily liquid boiling at 128° C. It is heavier than phosgene, has the same toxicity, and is an intense lacrimator.

Chloropicrin (P.S.)—nitrochloroform—is a colourless volatile liquid, not hydrolysed by water, and semi-persistent. It also is a lacrimator. It is heavier than water, boils at 112° C., and is approximately 5.5 times heavier than air. It is killed by a solution of sodium sulphite in 50 per cent. alcohol. It has a penetrating odour and is strongly irritant. Exposure to frequent low concentrations may induce attacks of asthma.

Paralysants—These substances are not of much practical use in warfare.

Carbon Monoxide.—The management of carbon monoxide poisoning will not be dealt with in this paper.

Gas-detection Table

The following simple hints have been already published (*Pocket Book of First Aid in Accidents and Air Raids*, second edition, 1939, G. Gill and Son).

Part of Body Affected	Appearance	Smell	Chief Action	Gas
Eyes and nose	Vapour	Pungent	Tears	Lacrimator
Nose and throat	Mist	Faintly fruity	Sneezing	Sternutator
Lungs	Colourless	Musty hay	Cough	Phosgene
,,	Green cloud	Pungent	Delayed collapse	Chlorine
Skin	Oily liquid	Garlic	Blisters	Mustard
,,	Vapour nil	Geraniums	Redness and blisters	Lewisite

Chemical Analysis

In the issue No. 10 of volume 56 of *Chemistry and Industry*, published in 1937, appears a very important seven-page paper on analysis for the detection of poison gases by Studinger and Müller, translated by Mr. F. G. Crosse, F.I.C., from an article in "Mitteilungen aus dem Gebiete der Lebensmitteluntersuchung und Hygiene," 1936. Some of the items of chief interest are described in the following paragraphs.

PREPARATION OF THE SAMPLE

Visible drops are soaked up in filter papers held in forceps or ether extracts are made from contaminated soil. All operations are carried out in a fume cupboard, the operator wearing a respirator if necessary. Phosgene is detected by the reagent mentioned in C.I. below.

PRELIMINARY TESTS

(1) Using small test-tubes, the boiling-point is detected. (2) Decomposibility in water: a capillary loop of the extract is heated with about 0.5 c.cm. of water and tested with a 5 per cent. solution of $AgNO_3$. Mustard decomposes slowly; chloropicrin and the arsines do not decompose. (3) Tests for halogens in aliphatic compounds or in the side chain of the aromatic poison gases. (4) Pringsheim's test: a mercuric chloride test paper is coloured yellow by AsH_3. (5) Testing for nitrogen and sulphur: (*a*) the Prussian-blue test; (*b*) sodium nitroprusside—2 drops of 10 per cent. solution are added to the substance under test after being heated with sodium, a violet coloration indicating sulphide (mustard).

From Tests 4 and 5 poison gases can be classified:

C.I.—Gases resembling chlorine only: xylylene bromide, chloro-acetophenone, palite (chlorine-phosgene).

C.II.—Gases containing chlorine and sulphur. Mustard.

C.III.—Gases containing chlorine and nitrogen. Chloropicrin (HCN).

C.IV.—Gases containing chlorine and arsenic. The arsines and lewisite.

C.V.—Gases containing metal. Iron, carbonyl, lead, tetra-alkyls.

SPECIAL REACTIONS

Halogen Test.—Xylylene bromide boiled with alkaline potassium permanganate solution forms phthalic acid. This is isolated by extraction with sulphuric ether. The residue is heated to 250° C. with concentrated H_2SO_4 and a little resorcinol. Excess of soda lye gives a green fluorescence.

Chloro-acetophenone (C.A.P.).—A long test, where the substance is oxidized to benzoic acid with chromic acid, then nitrated and treated with ammonia and hydroxylamine HCl solution. The presence of ammonium diamino-benzoate is shown by a red-brown coloration on immersing the tube in hot water.

Phosgene is detected as diphenylurea or by a colour test paper. Air is passed over the sample into an absorption flask containing anil-water; an immediate white turbidity is produced. This is filtered off, dried at 70° C., and its melting-point determined (235° C.). Two tests are given with prepared test papers. In the second test a green coloration indicates phosgene. The reagents required are: (1) 0.05 to 1 gramme 6-nitroso-dimethylaminophenol dissolved in 50 c.cm. of hot xylene; (2) 0.25 gramme *m*-diethylaminophenol dissolved in 50 c.cm. of hot xylene. 5 c.cm. of solution No. 1 are mixed with 1 to 2 c.cm. of solution No. 2 and put on to filter paper. This paper when held in the air above the sample turns green.

Chlorine.—One gramme of soluble starch is dissolved in 100 c.cm. of water containing 5 grammes cadmium iodide and 5 grammes sodium acetate. A filter paper moistened with this solution goes blue when chlorine is present.

Mustard.—Eleven tests are given, all but one requiring the presence of liquid mustard. Of these the simplest is the sodium iodoplatinate test paper, 2 per cent. solution. This paper in the presence of mustard or an aqueous mixture of it becomes purple-red, then blue. In this country yellow detector disks are provided which become red in the presence of liquid mustard. The chemistry of this test is secret, but it probably depends on selenium.

Grignard's test will detect the vapour of mustard. 20 grammes of sodium iodide are dissolved in a little water and an aqueous solution containing 1.65 grammes of copper sulphate is added. Into this mixture is stirred 2 c.cm. of a solution of 35 grammes of powdered gum arabic in 100 c.cm. of water. The whole is made up to 200 c.cm. and the cuprous iodide filtered off. This clear solution is stored in a brown bottle. When mustard vapour is passed through 3 c.cm. of this reagent a turbidity appears due to the formation of di-iodo-diethyl sulphide.

Chloropicrin.—Four tests are given. Of these the simplest is Labat's. One drop of chloropicrin extract is added to 2 c.cm. of 5 per cent. alcoholic potash lye. When a small crystal of thymol is dropped in a yellow colour appears. Several supplemental tests are given, which need not be described in this paper.

Summary

A sound knowledge of the chemical poisons which may be used in modern warfare is the preliminary essential to a complete acquaintance with clinical diagnosis, management, and treatment of casualties.

An intimate chemical study of all the "gases" will interest only a few experts, but a working knowledge of their physical and physiological properties should be acquired by all medical men as soon as possible.

(*The second part of this article will be published next week.*)

RED CROSS AND ORDER OF ST. JOHN

JOINT WAR-TIME ORGANIZATION

The British Red Cross Society and the Order of St. John of Jerusalem have amalgamated for the duration of the war, as they did during the war of 1914–18. A Joint Emergency Committee has been formed, and work is actively proceeding in many departments. The department of medical personnel is presided over by Lord Horder; that of nursing by Lady Ampthill and Dame Joanna Cruickshank, late matron-in-chief of Princess Mary's R.A.F. Nursing Service. The transport of wounded is under Sir Alexander Roger, director of the motor ambulance department of the Red Cross; Viscount Falmouth supervises the central hospital supply services; the Earl of Clarendon the work for prisoners of war and for wounded and missing; Lord Stanmore the auxiliary hospitals and convalescent homes; and Sir Charles Howell Thomas the very important matter of stores. The International Red Cross of Geneva has appointed a liaison officer—a Swiss gentleman, who is now in London.

Nursing Services

Neither of the two organizations which have now amalgamated has any recognized trained nurses' department in peace time; such a department functions only in war, and it has now been organized. Its task is mainly to deal with the nursing services of auxiliary hospitals and convalescent homes, and its first obligation is to the military authorities, but this time its activities are being extended to cover certain civil requirements, including those of maternity institutions. The nursing activities of the Red Cross are at present, as Dame Joanna Cruickshank explained to our representative, still in the preparatory stages, and their expansion will necessarily depend on the development of hostilities on the Continent. Meanwhile, a new uniform has been provided for the Red Cross nurse. It is designed with a view to comfort and ease in moving about and includes a low soft collar and soft cuffs. The V.A.D.s are again prominent, and there are many hundreds of V.A.D. depots in the country. This department is under the direction of Dame Beryl Oliver.

Gifts to the Red Cross

Meanwhile, in spite of the impoverishment caused among large sections of the community owing to the war, the Mansion House Fund continues to attract public support. Some of the gifts received have caused a certain embarrassment. The other day an anonymous donor contributed an eighteenth-century diamond necklace of unusual size and brilliance which has been valued by experts at £30,000. The problem is how to realize such a gift. At a sale by auction it would probably fetch nothing like its real value. The suggestion of a lottery has been made, but that method at present is illegal. Possibly the Chancellor of the Exchequer may be asked to pass a short Bill through Parliament legalizing such a method strictly for Red Cross purposes during war.

Aerial Ambulances

An event which has caused concern in Red Cross circles is the shooting down of a Red Cross aeroplane over Germany and the killing of an American woman doctor whom it carried. Article 18 of the Geneva Convention lays it down that an aeroplane is just as lawful a means of carrying wounded as an ambulance train, but that it must have the Red Cross properly painted on its wings, must not carry any national emblems (such as the swastika or tricolor), and must come down on demand. It is possible that the aeroplane in which this woman doctor was travelling failed to come down on demand. Aeroplanes are unlikely to be used to any great extent for the transport of wounded. The International Red Cross Conference which met in London last year asked the national societies to organize courses of training in aerial transport, but the carrying capacity of aeroplanes is very limited, and, moreover, while ambulance road vehicles can be readily replaced, it is not so easy to replace the ambulance aeroplane.

If any doctors wish to write to the Red Cross offering their services or making inquiries it will save time if their letters are addressed in the first instance to 2, Chesham Place, S.W.1. Doctors' wives and others who may like to make gifts or undertake work for Red Cross purposes may be interested to know that the urgent need of the moment is for wool in any shape or form, and any gifts of the kind will be greatly appreciated by the department which deals with the central hospitals supply services at the Victoria Club for Ladies, 9, Halkyn Street, S.W.1.

LONDON MILK SUPPLY

The London County Council reports an investigation, conducted some time before the outbreak of war, to discover the amount of liquid milk consumed daily in London and the treatment (if any) to which it is subjected. The daily consumption of milk in the county of London is 460,000 gallons. Information as to the treatment of 437,231 gallons is available, and shows that of this amount 405,162 gallons, or 92.7 per cent., is pasteurized, 10,191 gallons sterilized, 15,691 gallons processed, 1,696 gallons tuberculin-tested, and the remainder, 4,491 gallons, is ordinary raw or other untreated, including accredited, milk. Licences for the pasteurization of milk are held in London by twenty-eight dairymen, the depots being situated in fourteen boroughs. It is a matter for regret, says the Council, that as a minimum the proposals concerning pasteurization made in the Milk Industry Bill, 1938, have not been incorporated in the Milk Industry Bill recently introduced into the House of Commons. It is also regretted that if the term "accredited milk" is retained, no provision is made to ensure that such milk shall be of at least a better standard as regards the presence of tubercle bacilli than ungraded milk. Milk to be sold under the designation "accredited" must not at any stage be treated by heat. The use of the designation conveys the natural impression that such milk is of particularly high quality, and certainly higher than ungraded milk. A random analysis of samples of milk arriving in London in churns points to the conclusion that such a natural impression is unfounded, as the percentage discovered to be tuberculous was persistently higher in the accredited than in the ungraded milk. Since the beginning of 1938 the sampling has resulted as follows:

Year	Quarter	Ungraded			Accredited		
		No. of samples	Number tuber-culous	%	No. of samples	Number tuber-culous	%
1938	First ..	371	22	5.9	130	13	10.0
	Second	435	32	7.4	75	9	12.0
	Third ..	379	27	7.1	98	10	10.2
	Fourth..	434	32	7.4	83	13	15.7
1939	First ..	461	32	7.0	123	9	7.3

The results of this analysis of milk samples have been communicated regularly to the Ministers of Health and of Agriculture and Fisheries with a view to action being taken to remedy the unsatisfactory position.

Prostitutes.—The psychiatric examination of fifty-four prostitutes showed that one-fifth were to some degree mentally defective, a majority were constitutional psychopaths, and less than a fifth were comparatively normal. Nine-tenths had had venereal disease, usually both gonorrhoea and syphilis. Over half had severe physical handicaps. Almost all were addicted to alcohol, and some took other drugs. Forty-seven of the fifty-four had never engaged in any other occupation.—Psychiatric Examination of Female Prostitutes in Sweden. G. Jonsson.—*Acta psychiat.* 1938, **13**, Fasc. 4, 463.

HOSPITAL BEDS FOR CIVILIAN SICK

According to a statement issued from the Ministry of Health, the hospitals are acting upon the Minister's instructions that the arrangements for treatment of casualites must not be allowed to deprive the civilian sick of in-patient treatment for ordinary illnesses, if their condition requires such treatment. It is the Minister's intention that all the available accommodation in general and special hospitals should be pooled and used to the best advantage to meet the individual needs of each area, whatever they may happen to be. Great importance is attached to the maintenance of residential accommodation under the tuberculosis schemes of local authorities. Sanatoria and hospitals for tuberculosis should continue to function and to receive patients, especially those in the infective stages. Again, patients suffering from cancer, particularly those in the early stages of the disease, should be admitted to hospital for treatment. The Minister will issue a circular to local authorities giving guidance in these matters in greater detail. Meanwhile every possible assistance in planning hospital accommodation for the ordinary needs of the civil population will be given to medical officers of health by the Ministry's principal regional medical officers and hospital officers. The hospital officers are ready to advise on the number of hospital beds that can be allotted in an area for sick persons, while maintaining the necessary quota of beds for possible civilian and Service casualties.

Local News

ENGLAND AND WALES

Merger of Newcastle Hospitals

At a special court of the Royal Victoria Infirmary, Newcastle-upon-Tyne, held on September 30, the governors approved in principle the scheme for merging Newcastle hospitals, and the house committee of the Infirmary was empowered to effect mergers with the other institutions—namely, the Newcastle-upon-Tyne Eye Hospital, the Throat, Nose, and Ear Hospital, the Babies Hospital and Mothercraft Centre, and the Hospital for Sick Children. The purpose of the merger is to bring about economies in the working of the different hospitals, and by bringing the various institutions into closer co-operation to make them more advantageous to each other. Under the scheme, which will probably become operative at the end of the war, each institution will preserve its identity, and each will be separately governed and separately financed. It should provide for increased collective activity and concentration of opportunities for service and training.

London Midwifery Service

The London County Council has arranged to continue the domiciliary midwifery service and the maternity units in hospitals. Thirty temporary midwives have been appointed to supplement the permanent staff of seventy midwives. In view of the possible unreliability of postal and telephone services in war time, which might interfere with close relations between the head office, voluntary organizations, and domiciliary midwives, the midwives have been formed into self-supporting groups with leaders and deputy leaders. The leader's responsibility is to allocate bookings, distribute emergency calls, requisition drugs and supplies, and collect necessary records. Facilities are available for dealing with obstetrical emergencies. The effect of the evacuation of expectant mothers cannot yet be determined. It has to be borne in mind that the maternity beds in the London hospitals have been reduced in number by two-thirds, and that some of the evacuees are returning to London. It can be definitely stated that the work of the domiciliary midwives has increased owing to the additional ante-natal work to be undertaken as a result of the closing of borough clinics, the extra time taken to visit patients at night due to reduced street lighting, and the extra work thrown on leaders of the groups through decentralization of administration. The period of nursing has been reduced from fourteen to ten days, and twice-daily visits have been limited to three days instead of four from date of confinement. The rules in regard to refresher courses have been waived by the Central Midwives Board and courses arranged have been cancelled. All forms have been revised so as to supply only essential records and to reduce clerical work to the minimum. Arrangements have been made for certain hospitals, both council and voluntary, to continue to maintain a maternity unit, and the number of beds will be increased or reduced according to circumstances.

L.C.C. Reports

The annual reports of the London County Council extend to eleven separate volumes or parts and have been criticized on the grounds of being bulky and unbalanced. It has been decided that the only volumes to be issued annually shall be the report of the county medical officer of health, the report of the school medical officer, and the medical supplement, containing a series of papers and reports on purely medical subjects selected from contributions by members of the hospital and central medical staff, and the continuance of this last-named volume is also to be reviewed next year. The present annual report of the mental health services is not to be continued in a printed form. In most of the other departments of the Council's work it is not considered that an annual report is necessary, and instead of this a triennial general report will be issued. The reasons for the medical reports continuing to be issued annually are that the report of the county medical officer of health is the only report which comments on the vital statistics of the county, that it includes a comprehensive review of such subjects as housing, milk supplies, venereal diseases, tuberculosis, and the midwifery service, and that the issue of such a report is a statutory obligation on every other medical officer of health in the country; while the report of the school medical officer also is a requirement of the Board of Education.

First Red Cross Flag Day of the War

By means of flag days organized in the streets by individual hospitals citizens of London have in the past been in the habit of contributing large sums, chiefly in pennies, for the upkeep of their hospitals. Two years ago these flag days were combined, and instead of seventy-seven flag days held in London the hospitals organized two only, one in May and the other in October. Preparations were already made for a flag day on October 10, when it was announced that the Central Committee of the London Hospitals Street Collections, through its chairman, Lord Luke, had offered this flag day to be organized on behalf of the Lord Mayor's appeal for the joint organization of the British Red Cross and the Order of St. John. In accepting this offer the Lord Mayor stated that he was inviting others to co-operate throughout the country with the object of extending this London flag day into the first national Red Cross Flag Day of the war. In the short period of time at disposal a great burden of work will be thrown upon the workers giving assistance. Additional voluntary workers who are urgently required should offer themselves as soon as possible either to the mayor in their borough, or to Lord Luke, Chairman, Hospitals Day, 36, Kingsway, W.C.2.

Work at Papworth

The report for 1938 of the Papworth Village Settlement records generous gifts from Sir Edward Meyerstein and an anonymous donor towards the equipment of a large workshop, which is to be named after Mr. Chamberlain. The director, Sir Pendrill Varrier-Jones, reviews the difficulties encountered in the development of Papworth as an industrial enterprise, happily solved through the sympathetic collaboration of the Ministry of Health, the Friendly Societies, and the Trades Unions. Reviewing the future from the national point of view, Sir Pendrill claims that the way is now clear for the

division of industry into two grades, the first profit-making, the second non-profit-making. In the former category only fit men can be employed; Papworth belongs to the latter category. Sir Pendrill further points out that if second-grade industry had the benefit of the saving it effects it would be almost, if not quite, self-supporting. For example, men, women, and families now settled at Papworth would be drawing £17,500 a year in unemployment benefit if they were not at the settlement. Instead they paid, during 1938, £1,090 into Government insurance funds, while Papworth industries, their employers, contributed a further £1,131. Given this annual total of nearly £20,000, Papworth could provide the service of a sixty-year 3½ per cent. loan, more than large enough to build the entire settlement. The wide application of the Papworth experiment to the vast problem of disablement would not only be a financial benefit to the country, but would also remove from the disabled a legitimate source of grievance. "And let it not be forgotten that the most dangerous agitators, the most successful revolutionaries, have been the men rendered bitter by privation and disease."

At the annual meeting in London the president, H.R.H. the Duke of Kent, alluded to the work of Dr. Brown Cruickshank, carried out in the Papworth research department. Lord Willingdon, the chairman, said that wages to a breadwinner were often almost as vital to health as medical treatment, and that Papworth had associated the two in a big centre of social medicine. Sir Pendrill Varrier-Jones stated that the personal interest of the Royal Family had contributed largely to the development of Papworth. All the royal luggage for the Canadian and American tour was made at the settlement.

SOUTH AFRICA

The Capetown Health Report

Vital statistics recorded in the annual report for the year June 30, 1938, of the medical officer of health, city of Capetown, compare unfavourably with the figures for the preceding five years. The death rate showed an increase of 2.4 per cent. in Europeans and 4 per cent. in non-Europeans. On the other hand there was a decline in infant mortality of 9.4 per cent. in Europeans and 4.9 per cent. in non-Europeans. The depressed social and economic conditions of the non-Europeans, operating through under-nourishment, bad housing, overcrowding, and low cultural standards are reflected in classified mortality rates. For example, deaths under 25 years of age were 17 per cent. of the total in Europeans, 58 per cent. in non-Europeans. From tuberculosis the death rate in non-Europeans was 5.8 times as great as in Europeans. In infants under 1 year of age the death rates from measles, respiratory diseases, and diarrhoeal diseases were respectively 2.3, 4.8, and 6.2 times as great in the one race as in the other, and in infants between 1 and 2 years of age the corresponding rates were 5.9, 6, and 23.6. The report states that no new houses were built by the city council during the year under review, and that overcrowded and insanitary conditions are still all too frequent, not only among the coloured population but also among certain of the poorest of the Europeans. Houses affording reasonable accommodation for one family are often sublet to several, and in many cases whole families live in single rooms. In a recent survey of an area in Central Capetown, with a population exceeding 45,000, of whom 91 per cent. were non-Europeans, more than half were found to be living in single-room lettings; in another area one-third of the population were in a similar predicament. Despite extension of sewerage schemes many areas in the suburbs are still without proper drainage, and in June, 1938, faeces were being removed by men and wagons from nearly 6,000 premises dependent on pail closets. Among efforts to ameliorate the condition of the poorer sections of the community is a State-aided milk and butter scheme. The butter is sold at 6d., 5d., and 4d. a lb. for the first, second, and third grades respectively. Unfortunately the privilege of purchase is restricted to Europeans and Cape coloured; natives and Indians, despite the representations of the city council, are excluded. Milk is supplied to school children at a charge of 2s. per quarter, partly or wholly remitted in cases of poverty. During a temporary milk shortage cheese was supplied to coloured schools: 7,376 Europeans and 23,616 coloured children received a half-pint of milk or an ounce of cheese daily.

Correspondence

Radium Precautions

Sir,—In your issue of September 16 (p. 614) you say the Radium Commission would like to hear of any suggestions for resuming radium therapy. I have a simple one to make: pull the radium needles out of the bore holes and use the radium again. In common with many other radiologists, I think that this burying of radium needles is quite unjustifiable. It was done, I know, on the advice of some experts, but I am convinced it is a panic measure, based on a very faulty estimate of the dangers involved.

Think of the sequence of events necessary to cause a serious risk of radium poisoning. A bomb must hit the building, penetrate to the basement (where obviously the radium safe would be), burst wide open a heavy steel safe, and scatter into small fragments a large almost solid mass of a plastic metal, lead. It must then split open a considerable number of tough, malleable platinum containers (each of very small mass) and disperse widely the contained radium salt.

And now please draw up a balance sheet. Place on the credit side the hypothetical prevention of loss of life from this chain of improbable possibilities. On the debit side place the lives lost because radium therapy is withheld, and note the hopeless imbalance. So far the "black-out" accident cases and these cancer patients have been the principal British casualties. I submit that a sense of proportion in those in charge of the nation's radium would have lessened the number of the latter.—I am, etc.,

London, W.1, Sept. 26. S. Cochrane Shanks.

Organization of the Emergency Medical Services

Sir,—I quote from the article by Lieut.-Colonel W. A. Lethem which appears in your issue of September 23 (p. 656): "Probably a very high percentage of all casualties will be classified as orthopaedic, and at first will have to be admitted to any surgical hospital, though in time special types of case will be transferred to the care of surgeons with specialized experience." This is not the best treatment for orthopaedic cases. "In time" is a very elastic phrase. The cases may be a long time before they get to an orthopaedic hospital. Meanwhile in the stress of circumstances and for want of the "surgeons with specialized experience" undue suffering and avoidable crippling may result, and individuals will become an unnecessary financial charge on the country. Therefore, both on humanitarian and on economic grounds, these cases should reach a special orthopaedic hospital at once. I do not think that this is impossible. I wrote a letter which appeared in the *Times* of August 9 last to urge it. I recall the efforts of Sir Robert Jones in the last war which resulted, after some interval, in the establishment of special orthopaedic hospitals. I only wish that he were alive now to exercise his powerful influence in the direction which I advocate.—I am, etc.,

Cardiff, Sept. 27. A. W. Sheen.

Doctor and Patient in War Time

Sir,—The recent correspondence on the subject of war neuroses raises a subject of wide interest—namely, a doctor's influence on and his method of first approach to his patient. It is our ordinary task as doctors to give our patients courage in their illness and confidence in their recovery. Obviously in regard to material things a man cannot give what he has not got. This is equally true of emotional and spiritual things. Some men are fortunate in the firmness of their faith, and in having such a surplus of courage and confidence that their very presence is a help to their patients. For those of us who have not such surplus power as may be called for in the care and treatment of war-shattered patients there are two ways in which we can help ourselves to help them.

First, I believe that what we continually, consciously, and purposely think becomes a habit and affects our attitude of mind. We should therefore take pains to determine that our own thoughts are those of courage, confidence, faith, and hope. We must sedulously refuse every thought of fear, regret, resentment, and the like, because these thoughts arouse emotions that have a weakening effect. In other words, if it is not already our habit, we must set ourselves at once the task of collecting good stuff to give away to our patients. Secondly, let us mark the importance of words, both because of their meaning and because of their associations. Word associations are especially important, because they may become so strong that the original meaning of the word is lost.

With these things in mind, and realizing the effect of a first impression, it is interesting to reflect how often the first words spoken by a doctor to his patient are, "What do you complain of?" The reply may be in terms of a bad pain or other disquietening sensation, and quite often our next remark is, "I am sorry." And so the first word we use to our patient is complaint, a word that suggests something wrong, a word that opens the door to actual fear. The next word is "sorry," a word that suggests self-pity. What worse sensations than fear and self-pity can we offer to those who come to us for help? Surely we should forget the word "complaint," and only when we weakly allow ourselves to indulge a patient may we allow ourselves to pity.

The first question we put to a patient cannot of course be positive and certainly not buoyant. But it can be colourless, or, better, it can contain the idea of acceptance. It may seem difficult to think of opening questions on either of these two lines. With practice there are a number to be found. Needless to say the whole history of symptoms (better called sensations) should be taken on the same positive level of acceptance, or, failing this, on the colourless plane of kindly inquiry.

In making these suggestions it is in my mind that the doctor who is going to look after war-worn persons should first have thought as to his own attitude of mind and his method of approach to his patient. Generally we think of our patients first!—I am, etc.,

St. Albans, September 25. Geoffrey Evans.

Psychological Casualties in War

Sir,—I read with particular interest Dr. Maurice Wright's two articles on psychological emergencies and casualties (*Journal*, September 9, p. 576, and September 16, p. 615) because first as a battalion medical officer during the last war and secondly as a psychotherapist with the Ministry of Pensions in the following years I arrived through experience at certain views.

I have not so far seen anything published which suggests that the Ministry of Health is making any real preparation for psychological casualties. These casualties will be heavy among the civilian population, whose resistance has not been fortified by discipline and esprit de corps. Such casualties have the worst possible effect on morale. The civil population is inured to street accidents and injuries at work, and physical casualties will not differ greatly from these, but they are not used to psychological casualties and will suffer from them. Such cases are positively infectious and must be evacuated and kept away until they are rehabilitated. Moreover, they should not be detained in C.C.S. or other hospitals, but cleared as soon as possible to the appropriate special hospital, where their treatment can be carried out. The shorter the time between injury and the beginning of psychological treatment and the less the interference *en route* the quicker the cure.

I hold no brief for any "rapid" method of treatment, having seen as battalion medical officer many such cases when returned to duty. If they did not relapse they were generally quite useless, as no one felt inclined to trust to them in emergency. All supporters of rapid methods appear to me to be optimists. Sir Arthur Hurst (September 23, p. 663) is no exception. I worked in four different "shell-shock" hospitals, and relapsed Seale Hayne patients were admitted to all of them, and were generally found to have no insight into their condition.

I view with horror Dr. Wright's supposition that psychological hospitals will be large, admitting both sexes and all ages, types, classes, and even races. I feel that no psychological hospital should contain more than sixty or seventy patients with three medical officers and a superintendent. Dr. Wright mentions the urgent need of all neurotics for security, and as they cannot be expected by any means to gain this feeling in a danger area their hospital must be placed in as safe a position as can be found.

As to the shortage of psychotherapists, there must be many, like myself, too near the age limit to volunteer for the R.A.M.C. but who would be glad to resume the most interesting of medical work if they are required—as they will be. If we are considered too out of date as psychotherapists, which remains to be seen, I suggest that our previous experience might commend us as superintendents of psychological hospitals, where we could at least show our ability to understand and appreciate the work of the staff and the meaning of the "psychological approach." This was not always so in my past experience.

I should be glad to hear that the Ministry of Health was taking over country houses or small hotels in Cumberland, Westmorland, West Yorks, Wales, Devon, and Cornwall, and staffing them for this purpose. Such hospitals have the great advantage from the Treasury point of view that they require practically no expensive equipment.—I am, etc.,

Barton-on-Humber, Lincs, September 26. John A. Tippet.

Sir,—As neurologist to the Medical Research and Intelligence of the A.E.F. in France part of my duty in 1917 was to visit frequently the front stations as well as the base hospitals where neurotic casualties were dealt with in order to ascertain the best methods of rehabilitating men thus disabled.

Before the inauguration of successful methods in 1916, thousands of men had been relegated to base hospitals, where they were lost to the Service for months, and many for years, while I was informed that in England the losses were at least 100,000, most of these having been permanently discharged from the Army and their usefulness ended.

At the conclusion of the war the French method had been so perfected that there were left only eighty-seven intractables. Even then these were not discharged, the policy being to return them to civil life only when rehabilitated.

In order to send back the thousands of casualties to the fighting force without the long delay impracticable in warfare it is evident that no elaborate reconstruction of personality is feasible. Methods used must be rapid. It should also be evident, except to those ridden by *a priori* theories, that men who have adapted themselves to civil life and army training and warfare for months are not chronic misfits in need of complete readjustment. This is also true of the neuroses of civil life, in the treatment of which the coat should be cut to fit the cloth and not tailored to pattern, as theorists would have it.

Hence the disabling symptoms of an evacuated war neurotic were usually removable by rapid re-education, reinforced by the collective mass suggestion of a carefully devised environ-

ment in special centres where the exact methods varied with the individuality of the neurologist in charge, although all were based on the same principles. In the front line, however, the rapid restoration to duty of an acute neurosis was often possible to a skilful neurologist alone.

For the prevention of neuroses in the hospitalized the best method of all was that of the British Army Training Camp, to which every sick and wounded man in the later years of the war was sent before being returned to his unit. In these the ingenious yet simple method of restoring moral by collective influence was the idea of an unrevealed genius in the R.A.M.C. These camps followed the French example by keeping the patients in the advanced zone of the Army free from detrimental home influences. But when a whole country becomes liable to devastations by air attack, it may be asked whether this procedure will remain imperative.

These facts (presented in greater detail after the war in *The Military Surgeon*) should be of use in the present situation, perhaps even to the controversialists in these columns.—I am, etc.,

London, S.W.1, Sept. 25. TOM A. WILLIAMS.

SIR,—The article by Dr. Maurice B. Wright in your issue of September 16 (p. 615) is most timely and important and provides food for much thought and action. To a worker in neurological service during and after the last war the scheme appears useful and practicable. The most useful help for psychoneurotics is a person who understands their troubles, who enters their lives, and who by appeal can mobilize the scattered morale. Psychological casualties may be prevented or lessened by good food, adequate rest, sufficient security, and the inculcation of discipline, with the consequent raising of morale. The presence of a good A.R.P. service is an important factor.

At the aid post little treatment will be possible or expedient. The casualties will be retained until the "all clear" and then evacuated to the casualty clearing hospital. Here a physician experienced in such matters should see them, examine them, and sort them out into two groups. First, cases of little severity in people of fairly good morale may be retained for a week and then returned to their homes or to duty. This group will be a small one, but it includes those of excellent morale who have temporarily been put out of action by some sudden shock. About 5 per cent. of cases may be thus discharged. The second group of cases should be sent right away, far from the scenes which upset them, to some base hospital in the country. Here is security, good food, plenty of sleep, and sufficient interests to keep the patients' minds on brighter matters. Psychotherapy most suited to their needs is administered, preferably by a physician with psychotherapeutic experience. His colleagues should include a psychiatrist and a psycho-analyst for special cases. After six to eight weeks cases should be reviewed and regrouped. Patients in the larger group will have recovered to the extent that they may be transferred for further treatment at a convalescent camp or command depot. The smaller group will be transferred to special neurological hospitals.

At the command depot (for soldiers) or convalescent camp the time of the patient is more fully occupied by games, sports, and other exercises. In the case of soldiers training is gradually and sympathetically embodied and increased as groups improve. In six weeks it will be found that five out of six will be able to return to duty. Some do not benefit by this treatment and should be transferred to the special neurological hospitals.

At the special neurological hospitals the more severe cases arrive. These hospitals will be specially staffed. Longer and more individual treatment and longer time are requisite. Psychotherapy by several methods may be used, according to the judgment of the medical officers. It is here that the psychoanalyst school will have a chance to win its spurs. Its efforts will be cordially approved and its results noted with great interest. Physician psychotherapists (that rather old-fashioned group of clinicians to which I belong) will whole-heartedly assist in the great task of mending broken humanity.—I am, etc.,

Aberdeen, Sept. 18. A. W. HENDRY.

SIR,—Sir Arthur Hurst's letter in your issue of September 23 (p. 663) on the treatment of psychological casualties during war is particularly interesting to me.

I would like to point out the importance of making a correct diagnosis between functional and organic disorders. Medical boards have a tremendous responsibility, but how few of those who sit on these boards have any knowledge of electrical tests, or, if they have, employ them as an aid to diagnosis?

During my appointment as medical officer in charge of the department of physical medicine at the Special Surgical Neurological Hospital, Tooting, and afterwards at the Military Orthopaedic Hospital, Ducane Road, I tested many thousands of cases. These tests were an adjuvant to diagnoses already made, and gave an indication of the recovery of nerve injuries. I am sorry to say that in many cases functional was proved to be organic and organic functional. I particularly remember the case of a young soldier who had been shot in the neck, had produced a flail left arm from the shoulder, and had been told by "five medical doctors" (his words) that he would never use it again. He was discharged (*never to return to war and with the addition of a pension*). I italicize these words as I wish to point out the deep psychological effect this must have had on the soldier's mind. Moreover, he had already attuned himself into the future, with its advantages and disadvantages. Then I come along and find nothing abnormal with his electrical reactions, and carefully and tactfully have to get him to believe me instead of "five medical doctors." Luckily he was a keen cornet player, and was soon using his arm and did not have to go to Seale Hayne. No case of paresis, paralysis, etc., should be boarded without an electrical test having been done by an expert.

May I say how heartily I agree with the remarks of Mr. J. S. Kellett Smith (September 23, p. 664)—the effective fervent care of a well-qualified masseuse worketh marvels.—I am, etc.,

JOHN SAINSBURY, M.B., B.Ch.Oxon.

London, W.1, Sept. 27.

Psychological Treatment Centres

SIR,—It seems important at this stage of national stress that psychotherapeutists should put their house in order and pool their spirit for national use during the emergency. What happened in a war twenty years ago with military psychiatric casualties may not be the correct basis for understanding, assessing, or treating civilian neuroses in totalitarian war. Each psychotherapeutist should ere now have settled for his own practical usage basic ideas of psychic aetiology, and spectacular polemics about differential diagnosis or teleological therapy should be put aside for the more urgent need of medical organization to ensure the morale of the civilian population submitted to an unprecedented attack on its "nerves."

How are we as a profession to organize our resources so that we may be ready to meet the new demands upon our national protective functions? How are we to induce the potential psychotic to seek skilled advice or direction while he is still able and willing to do so? How are we to enlist quickly his social residue-values before he is a national debit and a source of psychic infection? Surely this is the problem rather than what "send-fool-further" (S.F.F.) label we shall put on him when he is already on the downhill road.

If sufferers avoid "mental hospitals," "voluntary certification," "psychiatric clinics," till they are beyond prophylactic help of static authorities, surely we need a more dynamic method of getting patients to come early without suggestion of stigma or misunderstanding of motive in our treatment direction.

This urgent demand is a by-product of our strange era and we need a new method of organization to deal with it. *There is at present no national system capable of tackling the problem.* The solution is clear. Establish centres of stability for reintegration of disturbed personality states; establish them to be in time to be working when they will be needed; establish them in a way to gain popular confidence; and, in order that prevention may have precedence of cure, establish them now.

The name "psychological treatment centre" (P.T.C.) is comprehensive enough to cover its primary purpose of being a casualty clearing station for all the multiplicity of minor as distinct from major psychiatric casualties; it is euphemistic enough to assist the doubtful and secretly phobic to come freely to get aid, and it is co-ordinative enough to allow room for all psychotherapeutists who desire to so serve, in part or in whole, for "the duration" and thereafter. If the local M.O.H., as already the rallying-point of local medical practitioners, be requested or empowered to choose or appoint men and women in his district who know local psychology, the establishment of "psychological treatment centres" all over the country could take place quickly and effectively. We have no need to quarrel about methods: only practical application in the present emergency could test the rival claims of various "schools." We need workers in this new sphere. Psychotherapeutists cannot be made in a day, nor can they be produced by a magician's wand in times of peril. They already exist. All they need is to be used, to be organized, and to be got ready for national service. I issue a call to all psychotherapeutists in this country: *Now* is the time to enlist your services for defence of the nation's nerves. —I am, etc.,

A. C. D. Telfer, M.B., B.S.

Walthamstow, September 29.

Organization of Aid Posts

Sir,—May I be allowed to comment on one important aspect of Dr. C. Seeley's interesting article on the organization of the emergency medical services in the *Journal* of September 30 (p. 697)? Concerning first-aid parties he states that "members of the parties must exercise discrimination in the initial disposal of cases, etc.," and I am officially informed that the ambulance men are expected to decide which cases are to go to hospital and which to the first-aid posts. (I did hear, at an official gathering, an even simpler rule—namely, that all ambulance-borne cases were to go to hospitals, all "sitting-up" cases to first-aid posts.) Now where the ambulance men have had some practical experience in air-raid work this method may work fairly well, also in cases where the distance to the casualty receiving hospital is short. But where the casualty receiving hospital is a long way away, and where the ambulance men have not had any practical experience of this type of case—that is, roughly in rural and semi-rural areas—it seems to me unjustifiable to put such a heavy responsibility on the ambulance-trained personnel unless it is quite impossible for them to obtain the opinion of a doctor.

Dr. Seeley states later on that "aid posts have been sited at hospitals . . . or in buildings close to hospitals." In Cheshire, and I believe generally throughout the country, first-aid posts planned at the local cottage hospitals have all been moved away; I think quite rightly. In these circumstances over wide areas ambulances must often pass by or close to an aid post before they can get to the casualty receiving hospital. Where such conditions obtain it would seem much more reasonable for such cases to call at the aid post and be seen by the doctor there, if possible, without being removed from the vehicle, and the doctor then can decide whether the case should go straight to hospital, whether it requires immediate treatment for pain or shock at the first-aid post, or otherwise give directions and remove responsibility from the willing but less well-trained first-aid parties. Colonel E. M. Cowell (April 29, p. 883) has stressed the importance of the immediate and preventive treatment of shock, and the excellent instructions for first-aid posts (E.M.S./Gen/245) issued on the outbreak of war gives as the second of the functions of such posts "to arrest haemorrhage, relieve pain, and so prepare those casualties who may be found to require institutional treatment that they can be transferred to the casualty (receiving) hospital with the least possible harm—that is, by having taken steps to prevent any immediate deterioration."

Whether such steps should be taken immediately or whether they can be safely left till the case can reach hospital is often a matter requiring much judgment, and certainly a skill beyond that of the usual ambulance trainee. Many doctors in charge of first-aid posts have had war training which should fit them admirably to discharge this onerous duty. It seems a pity to prevent the civilians who may be injured obtaining all the help they can from the doctors on the spot by giving positive directions to the ambulance men to do something for which most of them are quite unfitted. It would seem much wiser to give a general direction that ambulance men may be allowed to discharge this function, and leave to those responsible in each locality the duty of making the most satisfactory arrangements they can in their particular circumstances.—I am, etc.,

Winsford, Cheshire, Oct. 2. W. N. Leak.

Anaesthesia in War Time

Sir,—Concerned as this subject is almost entirely with the surgery of wounds, it cannot be divorced from surrounding conditions in which operations have to be done one after the other in quick succession and without the deliberate preparation and attention to perfected details that pertain in peace-time surgery. In the field there will be three chief categories of treatment:

1. The urgent abdominal and cranial surgery done by special surgical teams at the front.
2. The less urgent cases dealt with in casualty clearing stations.
3. The cases done in the general and stationary hospitals at the base which cannot wait over the time of transport to England.

In No. 1 the anaesthesia is in the hands of a special member of the team who will as a rule be selected from anaesthetic specialists. In cases of torn intestines or spleen, with abdominal haemorrhage, or in cases of head wounds the patients are often *in extremis* and the surgeons require as skilled anaesthesia as they can get. But in all the many casualty, stationary, and general hospitals there will be more anaesthetists required than there are specialists available. After a big action ambulance trains arrive with several hundred cases that require major operation.

By the refinements of modern anaesthetic practice, complex machinery has been introduced whereby ethylene, cyclopropane, and carbon dioxide as well as nitrous oxide and oxygen, and ether if required, can be administered. But these complicated contrivances are very far from being fool-proof—that is, beyond the management of those who are without constant experience of them. And when such contrivances go wrong they become dangerous and worse than useless. These considerations must be kept well in the forefront when the subject of military anaesthesia in active service on a wholesale scale has to be faced, or, in other words, *in the field*. Peace-time anaesthetics are an insufficient basis; we must go back to the experience of the 1914–18 war. We shall be operating on men in their youthful prime, in sound physical state, a certain number in shell-shocked condition, but not cases of liver or cardiac disease or diabetes or tuberculosis as are met with in civil life.

Nitrous oxide is a splendid safe anaesthetic, but only for minor operations; in major surgery it requires an anaesthetic specialist. It can be ruled out for general war use. The vast majority of war operations are in the major class. In these days of high explosives even a small punctate wound may be found to have much torn tissue that requires free excision. Avertin and paraldehyde, given per rectum from thirty minutes to several hours before operation, are impossible. Nembutal given intravenously requires special skill and care. Evipan sodium and pentothal sodium are too transient. Spinal anaesthesia lies in the hands of those surgeons who feel competent to give it in certain cases. Endotracheal anaesthesia can be reserved for hospitals which specially deal with dental cases. It requires wide-bore endotracheal tubes, cylinders, bag, and face-piece for nitrous oxide.

What was the outcome of experience in the last war? Undoubtedly that the most practical, most easily administered, most frequently used, and most satisfactory anaesthesia was obtained by giving chloroform and ether. In many hospitals this was preceded by a hypodermic injection of morphine 1/4 grain and atropine. Any qualified man could give the

anaesthetic. Shipway's apparatus was almost invariably used. Sometimes when a doctor was not available a nursing sister or an R.A.M.C. hospital orderly was employed and very soon learned to do it well. By Shipway's apparatus the time of induction of anaesthesia was shortened by chloroform, which could often produce analgesia before consciousness was lost. It required little practice to know when to switch over to the warmed ether, which then proceeded smoothly by the mere action of steady rhythmical compression of the rubber bulb. Premedication by hypodermic morphine helped considerably to lessen the quantity of anaesthetic required.

In the days following a big action most hospital theatres had to deal with a rapid succession of cases, one patient being no sooner removed than another was on the table, so that the more promptly the patient became unconscious the better for all concerned. Without access to mortality figures, one can safely say, speaking from actual experience, that deaths due solely to overdosage of chloroform and ether were an unknown factor. In the American war hospitals where they had a most marked national fear of chloroform it was noticeable that the American surgeons had to suffer delay and had more trouble in the maintenance of deep anaesthesia than was the case in British and French hospitals.

It would therefore become a great desideratum for any body or committee of anaesthetists who have to decide on the laying down of a scheme of war anaesthesia for general use to resolve to repeat the successful method employed in the last war and to make chloroform and ether (of known reliable brands) administered by Shipway's apparatus a component part of each and every surgical outfit.—I am, etc.,

September 27. G. D. G.

Emergency Treatment of Burns

SIR,—An official statement quoted in your *Supplement* of September 2 (p. 167) advises the use of picric acid. When this is put into practice a large number of cases of eczematous and blistering dermatitis from intolerance is sure to be seen. I know these plans have been worked out with careful consideration for the many factors involved, but I must call attention to the fact that a watery solution of gentian-violet is cheap, effective, non-irritating, antiseptic, easy to use even by the veriest layman, has to a degree a tanning effect, and gives symptomatic relief in second degree burns as picric acid does not.

I do not know how accessible gentian-violet is in England; my source has been Merck's aniline-violet, bought by me in 1-oz. bottles of the crystals for about $0.40. One ounce of the crystals stirred in 3 quarts of water (which need not be boiled) makes the suitable 2 per cent. aqueous (not alcoholic) solution, to be swabbed over the burned skin. It should be put on so as to enter the blisters, beneath the caps of which it forms a coating over the denuded dermis, allays pain excellently, and keeps the skin from contamination with Gram-positive bacteria and fungi. It may be applied to large areas, in adults or infants, without fear of toxicity or the provocation of eczema—advantages over picric acid. In the emergency treatment of burns by local application gentian-violet has no superior, a fact which experience will surely bear out if it is put to the test. The solution does not deteriorate.

Gentian-violet stops the action of staphylococci, fungi, and many streptococci. The streptococci which are not responsive to gentian-violet do respond to sulphapyridine and to moist applications of 1:10,000 bichloride of mercury. Few skin infections occur which cannot be treated with prompt success by the use of gentian-violet, supplemented as indicated by wet packs of bichloride of mercury.—I am, etc.,

Kansas City, September 20. RICHARD L. SUTTON, Jun.

X-ray Examination of Militiamen

SIR,—As one who advocates the periodic mass radiological examination of the "healthy" population as the only logical and worth-while method at present of detecting phthisis in its early and treatable stages, I could not but view with enthusiasm the opinion expressed by Dr. J. V. Sparks in the *Journal* (May 13, p. 1003, and September 23, p. 664) on the need for *x*-ray examination of the chest in militiamen. But the letter from Dr. J. E. Bannen (September 30, p. 702) has checked this enthusiasm and given me food for thought. For in it is introduced the term "arrested"—a clinical, nay, an administrative term that should be avoided by a radiologist at all costs—and there is advocated serial miniature *x*-ray photography, a method still on trial and considered as unreliable by several authorities. Radiological examination of militiamen would without doubt detect an appreciable percentage of early active tuberculous lesions that cannot even be suspected in the few minutes the examining medical officer is allowed to carry out the "complete" examination of the man, but it would also produce a much larger percentage of skiagrams, showing various apical shadows and exaggerated hilar and lung markings, which might lead to the unnecessary rejection of many men—these shadows taking the place with a vengeance of the added or altered sounds at the apices in the last war. Routine radiological examination of militiamen would raise a hornet's nest unless it was carried out by radiologists expert in chest radiography working in conjunction with an experienced tuberculosis physician or, better still, by tuberculosis physicians expert in the interpretation of chest skiagrams with such a radiologist available for consultation. The fact that in many quarters there is still some doubt as to the value of radiography in the diagnosis of phthisis and that discussions on the *relative* merits of physical and radiological examination in this connexion can still take place makes me wonder whether we have at our disposal the number of such trained people that would be required if the policy advocated by Dr. Sparks were adopted. Unless we have, it may be found that radiological examination of militiamen will prove for the military authorities (though not from the public health point of view) far from a blessing.—I am, etc.,

Staines, October 1. G. GREGORY KAYNE.

Evacuation

SIR,—The intolerable burden which has been placed on rural districts by the Government evacuation scheme cannot be sufficiently realized. As time goes on its effects will become more apparent.

Just at a time when one's nerves are somewhat on the stretch, when every household is worried, when husbands, sons, and relations are being called up to fight, when most of us have extra work to do—at that moment we are not asked but commanded to take evacuees into our houses. One will gladly admit that most of the evacuees are decent people, but even so, whatever rules may be laid down their entry into a private house means more work for the unfortunate housewife, who often is overworked already. In one's consulting room it is becoming increasingly common to see women whose health is being undermined by this worry and overwork.

In addition to those whom we may call the decent evacuees there is a sufficiently large minority of objectionable people to make the whole scheme a scandal and impracticable. I do not think it is using language any too strong to say that in many cases the scum of a town has been poured into a clean countryside with a most callous disregard for the consequences and apparently without the most elementary safeguards for the public health.

Is it not time to review the situation in the light of recent experience? The evacuees would fall roughly into three classes:

(1) Those who could remain in private billets where mutually agreeable.

(2) Those who would be more happy in empty houses, converted public buildings, etc.

(3) Those who require to be in a camp under some sort of discipline where they could be taught the rudiments of personal cleanliness, self-respect, and (incredible as it may seem) the use of a lavatory.

It should be possible to work out some plan whereby the present injustices to both sides are less acute, and in doing so I think our profession, which has an intimate knowledge

of the actual living conditions of all classes, might collaborate with the less informed urban authorities.

It is essential that we should know whether the Government, having evacuated these people, is content to leave the country districts to struggle on as best they can or whether it is actively engaged in devising new measures to ameliorate the present unsatisfactory situation. There are limits to what people will stand, and in too many cases these limits have already been reached.—I am, etc.,

Melksham, Sept. 28. I. C. Keir, M.D.

Sir,—In your issue of September 9 (p. 573) you published a short notice of the meeting of journalists summoned by Mr. Herbert Morrison, leader of the L.C.C., on September 4 "to rejoice with him on the completion that day of the evacuation from London of some 650,000 persons." *Audi alteram partem.* The reception areas are not impressed with the efficiency of the L.C.C. The letter in the *Times* of to-day's date (September 29), signed "Dorothea Coke," is an emphatic contradiction of Mr. Morrison's complacency. It ends with the query, "When is the L.C.C. going to wake up to the muddle it has made and send its staff [of welfare workers] down to remedy the shameful conditions it spread through the country."

These are strong words, but in the opinion of many country dwellers entirely justifiable. The L.C.C. apparently took no precautions to avoid the dissemination of vermin, or, if it did, its methods were ineffective.—I am, etc.,

Basingstoke, Sept. 29. Hugh Thursfield.

Sir,—You seem to think that the evacuation system is working well. If you ask general practitioners who go into the homes you will find it is the most unfair system ever devised. No one can say why people in many cases much poorer than the parents should have their home life ruined when plenty of empty houses were at that time available or why parents should not pay their share.—I am, etc.,

Ashtead, Surrey, Sept. 27. C. H. G. Prance, M.R.C.S.

*** The annotation in our issue of September 9 appeared under the heading "A Successful Exodus," and tribute was paid in it to the highly efficient way in which the process of evacuation was conducted. We concluded by saying, "There remains to be told, when the time comes, the story of how well the reception areas have risen to their opportunity."—Ed., *B.M.J.*

Medical Students in War

Sir,—May a medical student be permitted to raise a point which arises out of your "Medical Notes in Parliament' of September 23 (p. 667)? Dr. Elliot's reply to Mr. Parker's question in the House of Commons, so far as it was concerned with medical students, seemed particularly irrelevant. He, Dr. Elliot, could not believe that medical students wished to profit by the circumstances of war. Certainly we have no wish to profit in any way, but many of us are finding that in the present circumstances our training and living expenses are costing us very much more than in peace-time. In some areas the cost is nearly doubled, while in many instances students, or their parents, are less able to afford the cost of their training than hitherto. We do not necessarily object to this "tradition of voluntary service," but regard as a most undesirable anomaly a situation where we are not allowed to take up any other form of work and compelled to pay twice as much for "voluntary" work in which we have no option.—I am, etc.,

Oxford, Oct. 1. R. B. Buzzard.

Particulate Nature and Size of Filterable Tumour Agent

Sir,—Although for several years I have been profoundly sceptical of the validity of methods employed to demonstrate the particulate nature and size of the agent of filterable tumours, so far I have refrained from active criticism. It was considered more profitable to confine one's attention to the positive constructive task of trying to show how the phenomena of filterable tumour transmission, and especially the tissue specificity, could be much better explained on the assumption that the causative agent was of a non-particulate chemical nature.[1] The treatment of the subject in the leading article in the *Journal* of September 25 (p. 651) renders it necessary to point out some considerations, of the nature already referred to, which indicate that on this ground alone there is another side to the question than that championed therein. The principal methods in use for the purpose in hand are three in number, based respectively on (1) Poiseuille's law; (2) Stokes's (not Stoke's, as some who have written extensively on the subject have it) formula; and (3) microscopical examination.

Poiseuille's law has reference to the estimation of the pore diameter of a "membrane" possessing, as pores, straight cylinders of uniform small size and of circular cross-section situated between and at right angles to the "membrane" surfaces. The walls of these cylinders, moreover, are rigid, non-elastic, and non-compressible. Further, the determination of the average pore size is arrived at in practice by the measurement of the flow of pure water through the "membrane." In assessing the value of this method as applied to the present problem one may disregard the fallacies that arise through deposition on the membrane surface and adsorption on its pores, and the fact that it is the average pore diameter that is determined. These are of minor importance in the present connexion; although it will be evident that the former eventuality would decrease and the latter, on account of the maximum pores (which give rise to an unappreciated but highly important source of error where the estimation of the size of particles is concerned), effectively increase permeability. A major source of fallacy, which appears to be unsurmountable, however, remains. It may be indicated by remarking that it is incomprehensible how this formula, based as it is on the passage of pure water through rigid-walled cylinders arranged in regular pattern, has been applied so extensively to the determination of the size of elastic compressible particles which are being forced in the process of ultra-filtration through the irregular interstices, which are possibly mere artefacts, of an elastic compressible membrane.

Stokes's law applies to the deposition under the force of gravity of small, smooth, spherical, solid particles of uniform and constant density and size in a liquid of certain density and well defined and constant viscosity. In the application of this law to the problem in hand one may leave out of consideration as relatively unimportant the difficulties that arise from the fact that centrifugal force, not gravity, is employed, with the result that the motion of the particles alters with their distance from the axis of rotation, from the existence of vibrational and convectional disturbance of the fluid under centrifugation, and from the impossibility of avoiding inaccuracies in sampling and in determining in the extracts and centrifugates the concentration of the agent of filterable tumours. This latter drawback is in strong contrast to the accuracy with which the concentration of, say, gold sol may be estimated. That these difficulties may or may not be overcome is a matter of little moment in the final issue, since they are wholly overshadowed by another of greater magnitude and importance, which will now be referred to.

In view of the fact that solid particles such as lyophobe sols can raise the already low viscosity of the continuous phase, water, only by small amounts, and this simply in proportion to the volume of solid matter present, and that on the other hand the presence of small amounts of lyophile sols, such as albumin, may increase the viscosity some hundred times, the varying amounts of albumin in the continuous phase of a tumour extract has very considerable significance in regard to its viscosity coefficient. Further, if the particulate view of the nature of the agent is assumed, we are dealing in tumour extracts not with small, smooth, spherical, solid particles of uniform and constant specific gravity but with

[1] *On Rous, Leucotic, and Allied Tumours, etc.* (London, Lewis, 1928); *Edin. Med. J.*, 1929, **36**, 645; *J. Canc. Res.*, 1930, **14**, 527; *British Medical Journal*, 1936, **2**, 1334, and 1938, **1**, 698; *Edin. Med. J.*, 1937, **44**, 37.

rough particles of irregular shape which are quite definitely lyophile elastic and compressible, and therefore of varying and variable density and size. In Stokes's formula, $V=\frac{2r^2(S-S^1)g}{9\eta}$, V is the magnitude of the velocity of the particle, r of its radius, S of its specific gravity, S^1 of the specific gravity of the continuous phase, η of its viscosity coefficient, and g of the gravity constant. Here every quantity on the right side of the equation is subject to uncontrollable and indeterminable variations, a circumstance which places the utilization of the formula for the solution of the present problem entirely out of the question.

Finally, ultra-filtration and ultra-centrifugation may in the extreme case, conceivably, at times remove the whole of the agent from a tumour extract. It is not, however, to be argued on this ground that the agent is particulate. The onus of proof that the agent in such a case has not been adsorbed on particulate organic matter, such as cell debris, etc., and so removed, rests on those who hold an opposite opinion. The finding by microscopical examination of particles on the surface of the retaining membrane or in the deposit on centrifugation is of no avail in settling the question, since microscopical examination, alone or assisted by staining methods, has proved incapable of determining the nature of these particles.—I am, etc.,

Aberdeen, September 26. J. P. MCGOWAN.

Routine Tuberculin Testing of Children

SIR,—The introduction of the tuberculin patch test with its simplicity, painlessness, and relative freedom from severe local or general reaction raises the question whether tuberculin testing should not be more generally applied among children attending for medical examination at welfare clinics and the like. Such testing might be expected to result in (1) the discovery of early cases of active tuberculosis in children; and (2) the discovery of unrecognized or inadequately treated cases of adult tuberculosis among the home contacts of tuberculin-positive children.

The Camberwell tuberculosis officer realized the possibility of such a scheme, and with the approval of the medical officer of health the Vollmer tuberculin patch test has been applied during the present year to 350 children, aged between 1 and 4 years, who had attended the five toddlers' consultation clinics in the borough of Camberwell. Eighteen positives have been discovered and these have been referred to hospital for further investigation, including a skiagram of the chest. Of these eighteen, three children have proved to be suffering from pulmonary tuberculosis with sufficient evidence of activity to warrant immediate institutional treatment. The following case is illustrative:

A child aged 1 year was brought to the clinic for her annual examination. The mother said the child was quite well. Examination showed a sturdy vigorous baby of normal weight. The patch test was positive and there was a history of contact. The skiagram showed extensive lung infiltration, and activity was confirmed by a much raised sedimentation rate. After six months' treatment in a sanatorium the child is now progressing well.

In half the positives there was a clear history of contact, although in some of these the adult in question was not receiving treatment, and the occasion was used to exert pressure towards this end. In the remaining nine positives where there was no history of contact a special attempt to discover one by examining home contacts has been made by the tuberculosis officer. So far no new case of adult tuberculosis has been discovered in this way, but in one case such an investigation revealed that infection had occurred from a case of tuberculosis unknown to the child's parents. The case illustrates how mutually advantageous close co-operation between the toddlers' clinics and the tuberculosis dispensary can be.

A 2-year-old child was brought to the clinic for her annual examination. For some months she had not been as bright as usual, and had recently developed a slight cough. Physical signs were indefinite. The patch test was positive, but questioning of the mother failed to reveal any definite story of contact. A skiagram showed opacity of the right upper lobe, and she was sent to a convalescent home as a case of epituberculosis. Inquiries by the tuberculosis officer now revealed that the mother went to work during the day and left the child with a woman. A month previously the husband of the latter had died, but she had not disclosed to the child's parents that the cause of his death was tuberculosis, although frequent contact with the child had occurred. By also failing to disclose to the tuberculosis officer the child's presence in her house, the child had escaped the examination to which other members of the household had been subjected after the man's death.

The discovery within eight months of three cases of active tuberculosis in children, in two of which there were neither symptoms nor signs such as could have allowed the diagnosis to be made at this stage without the evidence afforded by the patch test, is surely striking. Might not the more general introduction of tuberculin testing of young children be a worth-while step forward in the campaign against tuberculosis?—I am, etc.,

London, N.W.1, October 7. DOUGLAS GAIRDNER.

The "Iron Lung" in Treatment of Scoliosis

SIR,—I am very grateful to Mr. S. Alan S. Malkin (*Journal*, September 30, p. 702) for trying out this method of treatment which I suggested in my letter in the *Journal* of February 25 (p. 416). His statement that, in selected cases, improvement has been very marked is particularly welcome. Of the two hospitals with which I am connected, at one the apparatus has not yet been fully assembled, while at the other it has been in constant use for the treatment of paralytic cases. When hospital conditions become more stabilized I shall endeavour to give the method a complete and prolonged trial. Meanwhile, I strongly endorse Mr. Malkin's opinion that this line of treatment should be tried in other centres.—I am, etc.,

Hove, Sept. 30. J. M. TURNER, F.R.C.S.

The Services

DEATHS IN THE SERVICES

Surgeon Commander EDWIN FOLLIOTT, R.N. (ret.), died at Salisbury on September 21. He was educated at St. Bartholomew's Hospital, and took the M.R.C.S., L.R.C.P. in 1896. After filling the post of assistant house-surgeon at Shrewsbury Infirmary he entered the Royal Navy, attained the rank of surgeon commander on May 25, 1911, and retired soon after the end of the war of 1914–18, through which he served, receiving the medals. He then specialized in tuberculosis work, serving as clinical assistant to the Plymouth Tuberculosis Dispensary and as assistant tuberculosis physician at Cardiff, after which he became tuberculosis physician to the King Edward VII Welsh National Memorial Association, and tuberculosis consultant to the Aberdare, Merthyr, and Mountain Ash general hospitals, and to Merthyr Infirmary, and medical officer of Pontsarn Tuberculosis Hospital.

Colonel JAMES MEEK, C.B., late R.A.M.C., died at Belfast on July 5, aged 77. He was born on November 20, 1861, and was educated at Queen's College, Belfast, where he gained an entrance scholarship. He graduated M.D. and M.Ch. of the Royal University of Ireland with honours, and gained the first Peel exhibition; he subsequently took the D.P.H. of the London Colleges in 1905. Entering the Army as surgeon on May 30, 1885, he attained the rank of Colonel on August 3, 1914, and retired on November 20, 1918. He served in the Sikkim War of 1888, gaining the frontier medal with a clasp; in China in 1900, on the hospital ship *Maine* (medal); in South Africa in 1900–2, first on the hospital ship *Maine* and later in operations in the Orange River Colony and in the Transvaal (mentioned in dispatches, *London Gazette* of June 17, 1902, Queen's medal with three clasps); and in the war of 1914–18, when he was mentioned in dispatches in the *London Gazette* of February 17 and June 22, 1915, in which year he received the C.B.

No. 37

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended September 16, 1939.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for : (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland. Median values for the last 9 years for (a) and (b).

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for : (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases ; a blank space denotes disease not notifiable or no return available.

Disease	1939					1938 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	15	2	9	—	—	17	1	8	1	—
Deaths		—	2				—	2		
Diphtheria	823	36	179	32	11	1,213	159	143	54	28
Deaths	28	1	2	1	—	21	3	2	—	—
Dysentery	34	2	20		—	40	13	25		—
Deaths			—	—	—			—	—	—
Encephalitis lethargica, acute	3	—	—		—	6	1	—		—
Deaths		—	1				—	—		
Enteric (typhoid and paratyphoid) fever	77	2	7	3	7	45	3	8	11	—
Deaths	3	—	—	—	—	5	—	—	—	—
Erysipelas			59	2	3			44	8	6
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years										
Deaths	48	4	19	11	13	56	11	7	7	7
Measles			7		4			19		3
Deaths	2	—	—	—	—	3	2	1	—	—
Ophthalmia neonatorum	64	3	22		1	94	10	35		2
Deaths										
Pneumonia, influenzal*	266	14	4		2	445	33	7		8
Deaths (from influenza)	10	—	3	—	—	15	6	—	1	2
Pneumonia, primary			103	5				155	4	
Deaths		—		7	2		9		—	4
Polio-encephalitis, acute	2	—				7	2			
Deaths		—					—			
Poliomyelitis, acute	29	8	1	1	1	76	7	11	—	—
Deaths		1	—				—	—		
Puerperal fever	3	3	15	3	1	4	4	15	3	—
Deaths		—					—			
Puerperal pyrexia	150	9	16		1	171	18	14		—
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,139	32	191	45	58	1,683	131	355	63	73
Deaths	3	—	—	—	—	2	—	1	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough			13		5			117		13
Deaths	6	2	1	1	—	8	1	4	—	1
Deaths (0–1 year)	251	26	67	39	16	289	46	48	23	9
Infant mortality rate (per 1,000 live births)						48	38			
Deaths (excluding stillbirths)	4,017	607	562	153	123	4,100	786	510	154	119
Annual death rate (per 1,000 persons living)			11.4	10.3	10.8	10.1	10.0	10.4	10.4	10.5
Live births	6,015	845	829	324	216	6,230	1,118	763	387	209
Annual rate per 1,000 persons living			16.8	21.8	19.0	15.3	14.2	15.5	26.2	18.5
Stillbirths	233	22	35			250	31			
Rate per 1,000 total births (including stillborn)			41			39	27			

* Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

EPIDEMIOLOGICAL NOTES

Infectious Diseases for the Week

There has been little change in the incidence of the principal infectious diseases during the last week or two. From many quarters there have been reports of an increase in the incidence of diphtheria and scarlet fever in rural districts due to the reception of susceptible subjects, but these do not appear to have been outbreaks of any magnitude. Some local authorities in these areas have expressed doubt as to the adequacy of the isolation hospital accommodation at their disposal, and are making plans to enlarge it. There has been little change in the last few weeks in the incidence of enteric fever and cerebrospinal fever, both of which tend to increase under war conditions, and the figures for acute poliomyelitis remain low—from a third to half of those recorded last year.

Owing to delays incidental to war conditions in collecting the weekly returns from certain districts the epidemiological table was omitted last week and appears in the present issue. It is hoped that as communication improves it will be possible to revert to the normal procedure. The figures for the median values for the preceding nine years are no longer available, as the data are not comparable in all material respects, and the column is therefore being discontinued for the time being.

Obituary

We regret to announce the death of Dr. THOMAS JOHNSTONE, formerly of Ilkley and Harrogate, who died on September 17 at the age of 86. Dr. Johnstone qualified M.B., C.M., and L.M. in 1874 and proceeded to the M.D.Ed. in 1877. In 1887 he took his M.R.C.P.Lond. After qualification Dr. Johnstone settled at Ilkley, where he remained for nearly forty years, and was appointed medical officer of health just over fifty years ago. He was also medical officer to the Ilkley Hospital and Convalescent Home and to the Semon Home. He acted as consulting physician to Ilkley Coronation Hospital, was physician to the Ben Rhydding Hydropathic Establishment, and senior resident physician to the Crichton Royal Mental Hospital, Dumfries. Subsequently he moved to Harrogate, and during the last war was engaged in work at the Ripon Dispersal Camp. A man of diverse interests, he was a director of one or two business concerns and was an energetic Freemason. Dr. Johnstone revised and edited a translation of Kraepelin's *Lectures on Clinical Psychiatry*. Among his contributions to medical literature he wrote on the clinical measurement of fatigue and on dementia praecox. He was a member of the British Medical Association for sixty-five years.

The sudden death on September 17 of Dr. LAURENCE JOHN HONEYWILL from septicaemia and pyaemia at the early age of 27 has come as a great shock to his friends. He was one of the most brilliant students of recent years at University College Hospital, and there was every reason to anticipate that he would have a very distinguished surgical career. Honeywill received his medical education at University College Hospital, entering the medical school there in 1933 with a Goldsmid Exhibition. He later shared the Magrath Clinical Scholarship and won the Atchison Scholarship awarded to the student "who within a period of three years reckoned from the date of his entry to the school has shown the best work and greatest proficiency as a student of the medical school and hospital." He qualified M.R.C.S., L.R.C.P. in 1936, in 1937 obtained the F.R.C.S.Eng., and a year later the M.B., B.S.Lond., with the University gold medal and distinction in surgery and obstetrics. After qualifying he was house-surgeon, house-physician, and casualty surgical officer at University College Hospital. He leaves a widow and an infant daughter.

Dr. CHARLES COTTON, F.R.C.P.Ed., a well-known archaeologist, died on September 28 at The Precincts, Canterbury, aged 83. Born at Twickenham on February 7, 1856, he studied medicine at St. George's Hospital, and qualified M.R.C.S.Eng. and L.R.C.P.Ed. in 1879, afterwards proceeding to the Membership and the Fellowship of the Edinburgh College. In 1895 he was appointed physician to the Ramsgate General Hospital and Seamen's Infirmary, and in 1910 became County Director of Voluntary Aid Detachments and Commissioner under the St. John Ambulance Brigade for the Canterbury area. Dr. Cotton was a prominent member of the Kent Archaeological Society, and wrote learned papers for the *Transactions of the Royal Historical Society* and *Archaeologia Cantiana*. His writings included "A Kentish Cartulary of the Order of St. John of Jerusalem."

The untimely death of Dr. JOHN GRAY, reader in pathology at the British Postgraduate Medical School, will be felt keenly, not only by the many pathologists who knew and appreciated his work but also by a wide circle of friends in London, Edinburgh, and Aberdeen. Gray was educated in Edinburgh, and, like so many of his generation, went straight from school to war service. At the end of the war he began to study medicine at Edinburgh University, where he had a brilliant career. After graduating M.B., Ch.B. with honours in 1923, he was appointed part-time assistant in the anatomy department, and engaged in research on the embryology of the pituitary gland. There followed a period as house-physician at Edinburgh Royal Infirmary before he was appointed lecturer in morbid anatomy in the University of Aberdeen, a post he held with distinction for nine years from 1925 to 1934. It was then that Gray was at his best, for almost all the time he was in London he was a sick man. In Aberdeen he carried out important investigations on nephritis. His first paper on this subject was accepted for the M.D. of Edinburgh University, and was awarded a gold medal. Subsequently he carried this work further and expanded it into a Special Report (No. 178) for the Medical Research Council. Shortly after the publication of this authoritative treatise Gray went to London and joined the staff of the British Postgraduate Medical School as reader in pathology. It seemed in every way an ideal appointment, but his health, never robust, broke down completely, and for the last few years Gray was a semi-invalid. No one who had the privilege of working with him in this period will forget his unfailing cheerfulness under increasing difficulties. A brilliant pathologist, Gray hid his wide learning and experience under a shy, even diffident, manner; this in itself was typical of the man—kind, sincere, and modest to a fault. He will be greatly missed.

Medical News

The Harben Lectures for 1939 of the Royal Institute of Public Health and Hygiene on "The Physiological and Economic Basis of Nutrition" will be delivered by Sir John Boyd Orr, F.R.S., at 28, Portland Place, W., on Monday, Tuesday, and Wednesday, October 16, 17, and 18, at 3 p.m. In the first lecture Sir John Orr will speak on dietary standards, in the second on assessment of state of nutrition, and in the third on the public health, agricultural, and economic aspects of the nutrition problem. Admission to the lectures is free, and application for seats should be made to the secretary at 28, Portland Place, W.1.

A meeting of the Royal Society of Tropical Medicine and Hygiene will be held at 26, Portland Place, W., on Thursday, October 19, at 4.30 p.m., when Sir Rickard Christophers, F.R.S., will deliver his presidential address on "Malaria in War."

A series of ten lectures to clergy and ministers on psychological problems arising out of war conditions, in particular air raids, is being given on Fridays at 11 a.m. in the Milton Hall, Manchester. It has been arranged by the Manchester Branch of the National Council for Pastoral and Medical Co-operation.

The eighth Pan-American Congress of the Child will be held at San José, capital of Costa Rica, from October 12 to 19. The congress will be divided into six sections devoted respectively to medical paediatrics, surgical paediatrics, infantile hygiene and eugenics, education, social assistance, and legislation and sociology.

The thirty-second Italian Congress of Dermatology and Syphiligraphy will be held at Bologna from October 7 to 12, when a bust of the celebrated Professor Domenico Majocchi of Bologna will be unveiled. The chief subjects for discussion are inguinal lymphogranulomatosis and tuberculosis of the skin.

Owing to the war there will be no meetings of the Harveian Society of London until further notice.

The Central Hospital Supply Service of the Red Cross and St. John, the department responsible for organizing hospital supplies, has moved from 41, Lowndes Square, London, S.W., to 2, Lowndes Street.

Under war-time arrangements pre-clinical students of London medical schools are located temporarily as follows: St. Bartholomew's and the London Hospital at Cambridge; Charing Cross, St. George's, King's College, and Westminster at Glasgow University; Guy's at Sherwood Park, Tunbridge Wells; St. Mary's at Manchester University; Middlesex at Bristol University; Royal Free at St. Andrews and Aberdeen Universities; St. Thomas's at Oxford; and male students of University College at Aberystwyth (University of Wales). Students in their clinical years have for the most part been distributed over the ten sectors whose apices are at their own teaching hospitals. The administrative offices of the University of London are now at the Royal Holloway College, Englefield Green, Surrey.

At a meeting of the General Board of the Westminster Hospital last week the measures taken in accordance with the Ministry of Health scheme for emergency medical services were reported. While the Ministry had agreed to pay the cost of reserving 200 casualty beds, the income of the hospital, at a time when it had just entered into occupation of new buildings, had been seriously affected. It had been necessary to make the hospital, nurses' home, and medical school light-proof, and the cost of this alone, amounting to over £3,000, fell upon the general funds of the hospital. The ninety-three beds reserved for civilian sick were being rapidly filled up. The governors agreed that these should be increased by thirty, and that twenty-four more should be reserved for private patients.

The president and honorary secretary announce that the condition of war prevents the Ligue Internationale Contre le Rhumatisme from continuing its activities. The bureau at Amsterdam will be closed, and this will discharge council members, representatives, substitute representatives, editors, and members of the Ligue Internationale from their rights and duties.

Arrangements for the removal by stages of 35,000 additional school children from the evacuation areas in England have now been authorized by the Ministry of Health. In some districts the movement has started this week. These children were registered by their parents when, following completion of the main evacuation at the beginning of September, the Government decided to afford a further opportunity for evacuation of unaccompanied children. As billets become ready and transport is arranged, parties will be dispatched according to arrangements made between the evacuating area and the corresponding receiving area under the general direction of the Ministry of Health and the regional staffs. All the children will be medically inspected.

The July issue of the *Bulletin of the History of Medicine* is devoted to the transactions of the fifteenth annual meeting of the American Association of the History of Medicine held at Atlantic City, New Jersey, on April 20 and May 1, 1939.

The appeal of the Belgian Red Cross to athletic and philanthropic societies for blood donors aged from 20 to 60 has met with a gratifying response. There are at present fourteen centres for blood transfusion in Belgium.

Universities and Colleges

UNIVERSITY OF OXFORD

No serious reduction is anticipated in the numbers of medical students, as the age limit is 20, and not 18, and any student with two terms' anatomy and physiology is reserved. Dr. K. J. Franklin is deputizing as Dean of the Medical School for Dr. B. G. Macgraith, and Dr. A. M. Cooke is Clinical Sub-Dean; Dr. Cooke is also Assistant to the Regius Professor of Medicine. Pre-clinical students from St. Thomas's Hospital have moved to Oxford, and to conform with the arrangements usual at St. Thomas's plans have been made for a ten-weeks instead of an eight-weeks term this Michaelmas. Oxford medical students began work on October 2, two weeks before the rest of the University. Courses will conform so far as possible to the normal, but there must be some adaptation to the emergency circumstances. In view of the disturbed arrangements in London clinical schools, the University Department of Medicine is offering to its own students only a complete second B.M. course in the Radcliffe Infirmary and associated hospitals, provided the war lasts that long. The initial ten-weeks course (general pathology and bacteriology and an introduction to clinical work) began on October 2. The Department is also offering facilities, but not set courses, to a limited number of its own students whose clinical courses, begun elsewhere, have been interrupted by the war. Applicants should write to the Clinical Sub-Dean, the Radcliffe Infirmary, Oxford, stating what they have already done, what they still have to do, and when they propose to sit for the Final B.M. examination. By a recent decree those students who have passed all the examinations for the first B.M. are deemed to have passed all the examinations requisite for the degree of B.A.—that is, they will not, as most of them normally do, interpose a year of study for the Final Honour School of Animal Physiology between the first and second B.M. courses. At the moment the arrangements for the 1939 B.M. examinations stand, but there may be changes in 1940. The first B.M. examination begins on December 4, and the second B.M. examination on December 6, 1939. The D.O. course and examination are suspended for the academic year 1939–40. The address of the Dean of the Medical School remains as before—namely, Department of Medicine, the Museum, Oxford.

UNIVERSITY OF LONDON

London School of Hygiene and Tropical Medicine

It has been decided that the office and certain departments of the London School of Hygiene and Tropical Medicine shall remain for the present at the school building in Keppel Street, Gower Street, W.C. Although courses normally lasting an academic year have necessarily had to be discontinued for the time being, it is hoped in the near future to provide short courses of instruction in tropical medicine and hygiene. The school library will be open between the hours of 10 a.m. and 5 p.m. (Saturdays 10 a.m. and 12 noon), and the librarian will be glad to answer inquiries by post or telephone.

UNIVERSITY OF GLASGOW

At a graduation ceremony held on September 27 the following medical degrees were conferred:

M.B., Ch.B.—*A. W. Kay, *D. Struthers, *G. C. McKinlay, †A. Muir, †A. Allison, †W. D. Buchanan, †H. B. Young, † C. M. Steven, †W. Blair, †H. N. Munro, †K. R. Urquhart, †A. H. Lauder, †J. Milne, † Alexina MacL. Paterson, †D. G. Wright, †Isabella M. Kerr, G. F. Allan, G. R. Anderson, W. Anderson, B. Andrew, Janey C. A. Arnott, J. Ballantine, H. Barrowman, I. S. Bergius, A. Berkovitch, J. Black, Catherine I. Blyth, Enid E. Brackenbury, A. Brown, Marrion A. McK. Brown, O. T. Brown, W. Brown, Janet M. Bruce, Margaret L. Bryson, A. M. Buchanan, J. R. F. Buchanan, M. Buchanan, Helen D. Burns, Margaret Callaghan, H. C. Campbell, J. L. Campbell, W. R. S. Campbell, D. Canning, Agnes E. D. Cathcart, M. R. Chassels, S. Childs, S. Citron, J. Corbet, R. L. Coulter, L. Couper, J. M. Crawford, Muriel C. H. Cunningham, J. P. Currie, R. G. Dalziel, Barbara M. Davidson, Isabel Davidson, P. W. McL. Davidson, A. S. Dawson, A. Dick, J. Donaldson, J. L. Douglas, H. Duff, H. G. Easton, G. M. Edington, R. S. Edington, H. Fairlie, J. Ferrier, R. Finlay, J. W. Fleming, J. U. Forbes, J. A. Fraser, J. F. M. Frew, Marion S. Gardner, Marjory A. Garrey, W. M. Gibson, J. G. Gillan, Janet B. Grant, S. Haase, H. L. Hart, Mary B. Howat, T. K. Howat, J. F. K. Hutton, Jesse D. Johnston, W. C. Johnston, L. G. Jubb, G. M. Kesson, A. W. Lees, G. Leslie, Milicent H. S. Leslie, Brenda E. Linck, R. Livingstone, W. P. D. Logan, J. Loudon, Jean M. McArthur, J. J. McCall, A. I. McCallum, J. McComb, E. L. F. McConnachie, J. S. McCrae, A. C. Macdonald, I. A. Macdonald, T. L. Macdonald, J. L. MacDougall, H. M. Marfarlane, I. W. Macfarlane, I. D. Macfie, P. G. McGrath, W. Q. McIntyre, A. McN. McKelvie,

W. B. McKenna, W. R. Mackie, C. M. McLean, A. MacLellan, I. McLennan, J. A. MacLeod, R. G. MacLeod, Helen McC. McNeish, P. F. Maguire, S. S. Mair, K. C. Matheson, H. J. B. Miller, R. I. Mitchell, R. Montgomery, Greer C. Murray, Margaret K. Murray, R. Murray, J. C. Mustardé, R. S. Patrick, R. Paul, D. Raeside, E. Rentoul, W. D. Richardson, Mary McC. Richmond, W. D. Ritchie, R. B. G. Robertson, N. O. Rodger, J. Rogers, A. M. Roy, D. Salamon, J. Scobbie, Dorothea H. Graham-Service, F. Shaw, J. Simpson, J. C. Simson, J. G. Smith, Jean McC. Smith, P. Sommerville, W. Steele, Elizabeth M. Stephen, Mary Sullivan, J. D. Thomson, Janet Todd, J. W. Totten, J. A. Urquhart, R. Waddell, F. M. Wainman, A. P. Walker, R. T. B. Watson, J. Weir, W. P. Weir, Margaret E. Wells, Janet C. Willock, Margaret P. Wilson, R. M. Wink, G. M. Wood, Marion T. Wright, Eileen S. M. Wybar, A. K. Young.

* With honours. † With commendation.

Andrew Watt Kay gained the Brunton Memorial Prize, awarded to the most distinguished graduate in medicine for the year 1939.

The West of Scotland R.A.M.C. Memorial Prize was awarded to Andrew Watt Kay as the candidate with the highest aggregate marks in surgery, medicine, and midwifery in the Final M.B., Ch.B. examinations held during 1939.

The Macewen Medal in Surgery was awarded to David Struthers as the candidate who obtained the highest aggregate marks in surgery in the Final M.B., Ch.B. examinations held during 1939.

The Stockman Medal was awarded to Hamish N. Munro as the candidate who obtained the highest aggregate of marks in the professional examinations in materia medica and therapeutics and medicine (written, oral, and clinical), excluding paediatrics, in 1939.

The John W. Weir Prize was awarded to Andrew Muir as the candidate who obtained the highest aggregate number of marks in midwifery and diseases of women in the final degree examinations in medicine held in 1939.

GUY'S HOSPITAL DENTAL SCHOOL

It is proposed to reopen the Guy's Hospital Dental School on November 1 at a large clinic one and a half miles distant from Tunbridge Wells. Provision is being made for students in all stages of their course, including pre-medical studies. The clinic is situated in the neighbourhood of the base hospital of the Guy's Sector. There will be a subsidiary clinic in which conservative work, extractions, and prosthetic work will be carried out actually in Tunbridge Wells. Accommodation will be provided in the School for some of the students. Further particulars may be obtained from the Sub-Dean, Guy's Hospital Dental School, London Bridge, S.E.1.

Medical Notes in Parliament

Mr. Chamberlain made a statement in the House of Commons on October 3 about the war. He said that if peace proposals were made the British Government would examine and test them. No such proposals had yet been received.

The Finance Bill was read a second time in the House of Commons on October 2. Replying to the debate Sir John Simon mentioned that cosmetics had been put on the list of prohibited imports. During the preliminary debate on the Budget Resolutions Sir Arnold Wilson said on September 28 that many would welcome a tax on medicines, even including healing medicines, provided a small sum were earmarked for the medical health services of the nation. Sir Francis Fremantle, speaking on September 29 on a proposal to reduce the sugar duty, said enormous damage was done to the teeth of children by confectionery, and that dental decay was at the root of rheumatism. The motion to reduce the duty was defeated. Mr. Boothby, speaking on the Finance Bill on October 2, referred to the case of a Harley Street physician, with a very high rent, who had been making sums of anything from £5,000 to £10,000 a year, and now found himself on Government work in a hospital at a salary of £400 a year; yet he had to pay tax on the very large sums he had earned in recent years. Sir John Simon intervened and said: "What my hon. friend is saying is not in accordance with the provisions of the Bill or what I said in my speech. I am so conscious of cases of the sort that he has quoted that I explained in my Budget speech that instead of calling upon such a taxpayer to pay in respect of those thousands of pounds earned in past years he would be entitled to substitute his actual earnings of this year. That is an enormous alleviation."

The Parliamentary Medical Committee met at the House of Commons on September 28, with Sir Francis Fremantle in the chair, and will continue regular meetings during the war. Sir Francis Fremantle, as representative on the Central Emergency Committee of the British Medical Association, reported on the present position of the profession. The Committee discussed the under-employment of medical men in certain public services, the establishment of military hospitals in the United Kingdom, the interchange of patients between civil and military hospitals, and the medical treatment of the civil population. It also considered the admittance of patients to hospitals, their evacuation to more distant hospitals, and evacuation of patients to their homes. Petrol rationing to medical men and the employment of radium were discussed. Subsequently Sir Francis Fremantle and Dr. Howitt went as a deputation to Dr. Elliot, put forward considerations on several subjects named above, and found that he is active to rectify defects.

Hospital and Medical Services for Civilians

On September 26 Mr. Sorensen asked the Minister of Health whether he was aware of the acute suffering and hardship caused by the removal of certain patients from hospitals to their homes, by the refusal of beds to patients needing special treatment, and by the relative scarcity of medical services in reception areas, and also of the number of doctors, nurses, and other medical staff on duty but performing no immediate service in hospitals allocated to deal with air raid victims. Miss Horsbrugh said that the Minister was aware that difficulties and hardships had inevitably arisen from the far-reaching steps which were of necessity taken to deal with the possibility of large numbers of casualties from air raids. Numerous steps had been taken to enable the best possible use to be made of the hospital accommodation and medical and nursing personnel at present available. Arrangements had been made to release for part-time service in private practice a number of doctors at present employed in the Emergency Medical Service. All possible publicity had been given to several announcements that patients whose condition required hospital treatment, whether in-patient or out-patient, should certainly receive it. The Minister was continuing to keep the situation closely under review.

Health of Evacuated Children in Scotland

On September 26 Mr. Henderson Stewart asked the Secretary for Scotland how, in view of the large sums spent on health services in the cities of Scotland and the repeated assurances that these services were adequate and efficient, he accounted for the serious bodily condition of so many of the persons recently evacuated; and whether he would order an immediate inquiry into the health services of the cities of Scotland. Mr. Colville said there had been a tendency to exaggerate the position, but that a proportion of the evacuated children were suffering from skin diseases or were in a verminous condition. He did not consider that an inquiry such as Mr. Henderson Stewart suggested would serve a useful purpose in present circumstances. He had arranged that the local authorities of sending areas would make a thorough medical inspection and give whatever treatment was necessary before any further children were evacuated. The evacuation took place in conditions of urgency, at a time when the supervision of the children was curtailed because of school holidays.

Care of Expectant Mothers in Reception Areas

Dr. Elliot stated on September 28 that as normal public health services included organized visiting of expectant mothers, he was taking steps to ensure that such services were available in reception areas for evacuated women as well as for the ordinary population. Steps for augmenting health visiting staff were primarily a matter for the welfare

authorities in the different areas to decide upon. He would shortly issue a circular giving advice to welfare authorities on this and other matters relating to the health of evacuees. He had no particulars showing to what extent health visiting staff had been transferred from evacuated to reception areas. An extra allowance to the householder for undertaking the additional responsibilities of attending upon an expectant mother during confinement was applicable in cases where, by agreement with the householder, arrangements were made for the confinement to take place in the billet. The usual arrangements were for the confinement to take place in a maternity hospital or maternity home. The availability of these arrangements should obviate any difficulty in cases where a householder who was otherwise willing felt unable to provide lodging and attendance for the mother for the payment of 10s. a week.

Patients evacuated from Hospitals

Miss Rathbone asked on September 29 whether any systematic review had been or would be made through the hospital or medical authorities or otherwise of all the patients evacuated from hospitals to their homes at the beginning of the war for the purpose of ascertaining whether they were receiving adequate medical and nursing attention. Dr. Elliot in reply said all hospitals had been instructed to provide in-patient treatment for all in need of it. If the medical advisers of patients requiring hospital treatment gave a certificate to this effect the patients should be able to obtain admission to hospital, whether cases evacuated from hospitals to their homes at the beginning of the war or fresh cases. He did not think it necessary to call for a special review of the cases sent home by the hospital authorities at the beginning of the war.

Dr. Elliot, in reply to further questions, said all these cases were covered by domiciliary services, or through the insurance schemes, or through the out-patient department of the hospitals. If any almoner, district nurse, or anybody else came into contact with any case which required hospital treatment they should refer the matter to the patient's medical attendant, or, if the patient had no medical attendant, to the public assistance authority. Only on the certificate of a medical practitioner would a patient be admitted to hospital. In that way the population was fully covered.

Evacuation Problems

Replying, on September 29, to a question by Sir Ralph Glyn on evacuation, Dr. Elliot said the Ministry of Health, both at headquarters and through the regional organizations in the country, constantly sought to adjust the difficulties and hardships to which so large a movement, carried through of necessity in so short a time, inevitably gave rise. Full account was taken of the many reports, official and unofficial, from the receiving areas. Improvements and developments, and revision of policy where called for, were indicated in communications to the local authorities, such as Circular 1871 recently issued. A circular on medical arrangements would shortly be sent out. Representations on the necessity for adequate medical examination of evacuated school children would receive full weight.

Supply of Inhalers for Lung Conditions.—Mr. Sorensen asked on September 26 whether the Government had considered the provision of an inhaler or apparatus for the immediate treatment of the lungs of sufferers from a gas attack, and whether its inclusion in official air raid precautions outfits would be recommended. Miss Horsbrugh replied in the affirmative. She said Sir John Anderson was arranging for the supply to hospitals of inhaler apparatus for those suffering from lung conditions, whether caused by gas or otherwise.

Notes in Brief

Nearly one-third of the mothers evacuated from Glasgow have returned.

Sir Victor Warrender states that the Army recruits physical development depots were abolished on mobilization, and the buildings have been allotted to other uses.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to The Editor, British Medical Journal, B.M.A. House, Tavistock Square, W.C.1.

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone, unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the *British Medical Journal* must communicate with the Secretary, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

ADVERTISEMENTS.—All communications should be addressed to the Advertisement Manager (office hours 9 a.m. to 5 p.m.). Orders for copies of the *Journal* and communications with reference to subscriptions should be addressed to the Secretary, B.M.A. House.

The Telephone Number of the British Medical Association and the *British Medical Journal* is EUSTON 2111.

The Telegraphic Addresses are

EDITOR OF THE *BRITISH MEDICAL JOURNAL*, *Aitiology Westcent, London*

SECRETARY, *Medisecra Westcent, London.*

The address of the B.M.A. Scottish Office is 7, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh;* telephone 24361 Edinburgh), and of the Office of the Cumann Doctúirí na h-Éireann (I.M.A. and B.M.A.), 18, Kildare Street, Dublin (telegrams: *Bacillus, Dublin;* telephone 62550 Dublin.)

QUERIES AND ANSWERS

Dermatological Out-patients

Dr. P. Farrell (London, E.3) writes: Can anyone tell me where I can send my poorer patients for a second opinion on dermatological questions? I have made so many abortive telephone calls that I thought a general inquiry might better achieve the result I seek.

Purchase of Medical Books

Mr. H. J. McCurrich, M.S., F.R.C.S. (Hove, Sussex), writes: I should be glad to know why I can buy any medical book at a local bookseller's at list price and the local bookseller gets a profit on the transaction, yet I am inundated with circulars of medical publishers, who send me a list of medical books with the net prices and the cost of postage. It is usually cheaper to buy direct, but in the case of medical books the reverse is the case. I submit that not only should the publisher pay postage, but should allow discount to the medical profession, as drug manufacturers do, so that it comes to the same thing if the publisher sells to a bookseller or a doctor, but a doctor buying direct saves the middleman's commission. Meantime, when it is essential to exercise every economy, I would suggest to my colleagues that they buy medical books at list prices from their usual bookseller.

LETTERS, NOTES, ETC.

Second Attack of Scarlet Fever

Dr. Sydney Tibbles (London, W.1) writes: In 1914 I had a second attack of scarlet fever following one in infancy. A doctor friend sent for Dr. Porter, M.O.H. for Marylebone, who sent me to the London Fever Hospital for the first six weeks of the war. Probably the infection came from children seen at the Miller General Hospital when acting as oculist to the Greenwich Education Committee.

Mr. Bumble Misquoted

Dr. W. B. Bennett (Liverpool) writes: The writer of the medico-legal article in the *Journal* of September 9 (p. 590) probably thinks he is quoting Dickens when he describes the law as "a Hass," but Mr. Bumble said "a Ass." I suspect the numerous writers who are responsible for this misquotation have never read Dickens, but are merely quoting one another.